CCS 400

Service manual
System Description

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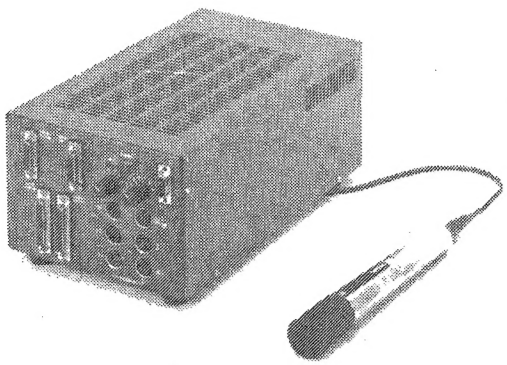

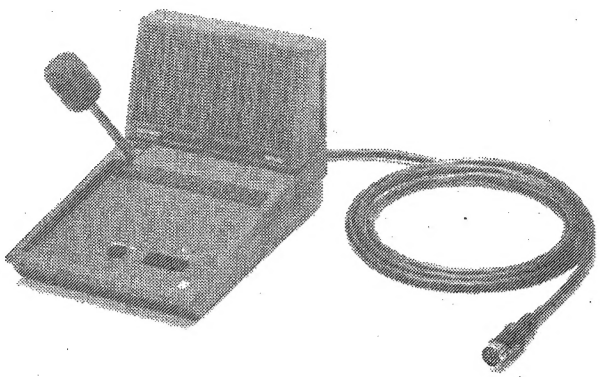

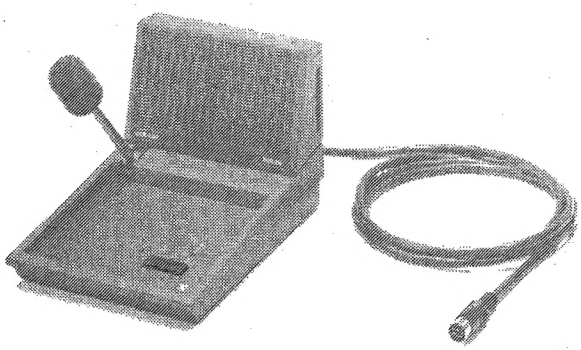

PHILIPS

Industrial &
Electro-acoustic Systems

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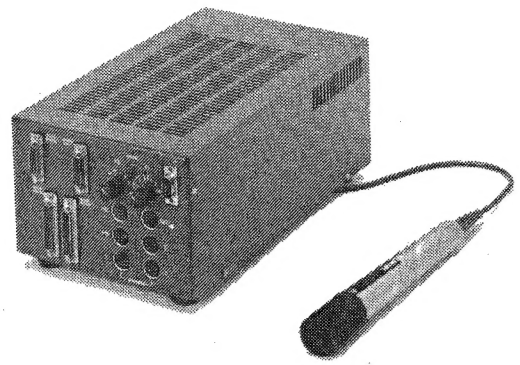
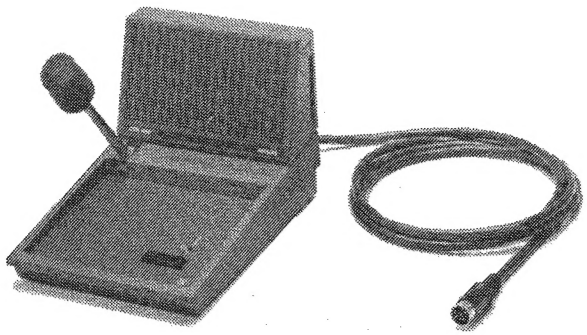
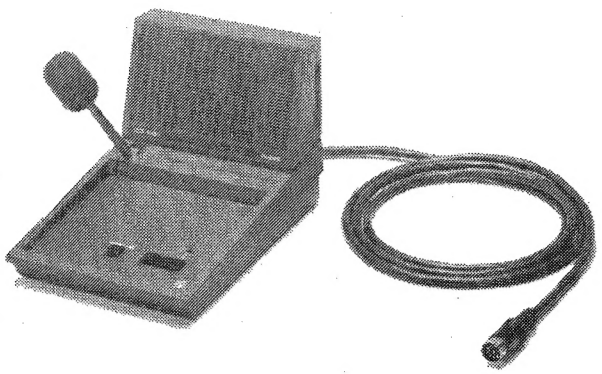
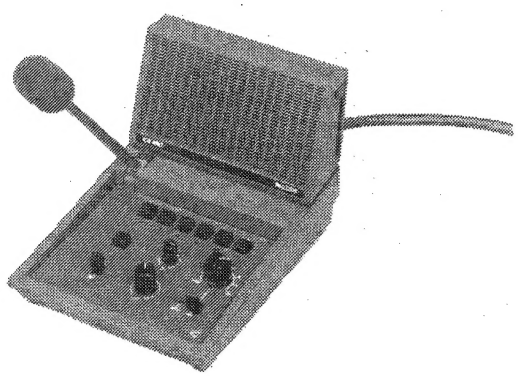
CCS 400 Discussion, Conference, and Interpretation system.









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Figures.

1. INTRODUCTION

Central Supply Unit/Interface (C.S.U.) LBB 3300/NN

1. The CSU controls the maximum number of simultaneously switched "on" microphones.
2. The CSU provides
   - volume control of the whole system
   - the priority attention signal
   - 3 db attenuation of the Audio signal when two or more microphones are switched on.
3. The CSU provides the supply voltage for the delegate units and chairman unit.
4. Two chains of maximum 35 units can be connected.
5. Maximum 18 6ch. interpreters desks can be connected to the system.
6. Distribution to channel selectors can be provided, when a Monitor Distribution Board (MDB) is inserted. Simultaneous distribution via a transmitter is possible.
7. A telephone coupler-, tape recorder-, and line in/line out connector is available.
8. By equipping the central supply unit with a plug-in unit (LBB 3302/00), a hand microphone can be connected.

LBB 3300/..

Central Supply Unit (CSU)

. Completely pre-wired unit with a basis PcB, a contribution panel, and power transformer.
. Two internal connectors are available to connect a roving microphone plug-in unit, and an interpreter monitor panel + Monitor Distribution Board.
. Mains switch on the rear side.
. Connection for delegate's, Tel. coupler, recorder, line-in/out, and if applicable a hand-microphone, are all to be found on the front side of the unit.
. When the interpreter/monitor panel is added to the system, connections for distribution, monitoring, transmitter and interpreters units, are also located on the front of the unit.

LBB 3302/00

Handmicrophone plug-in unit + handmicrophone

. Can be connected internally into the central supply unit via the contribution panel to the basic PCB.
. Interfaces the handmicrophone to the central supply unit, therefore acting like a normal delegate's unit.

LBB 3301/00

Interpreter + Monitor distribution panel

. Can be connected internally into the central supply unit via the contribution panel to the basic PCB.
. Interfaces the 6ch. interpreters desks to the system and if applicable to Monitor Distribution Board.
. The panel also provides three extra external connectors, for a monitor unit, a transmitter and distribution.

LBB 3203/00

Monitor Distribution Board (MDB)

. Connected internally to the 3301/00.
. Provide, ch1/ch6 and floor to be monitored by the program selectors. (distribution)
. A selected channel is amplified together with the comm. signal and routed via 3301/00 to the monitor connector.

LBB 3350/00

Table Top Delegate Unit

. Built in loudspeaker and microphone.
. Microphone on/off button, pilot lamp, microphone "ON" indication lamp and microphone request lamp.
. The mic. on/off button only becomes a request button, when use is made of a central control desk.
. Jack for headphone connection.
. Automatic delayed mic. switching off circuit.

LBB 3450/00

Table Top Delegate Unit
. Identical to 3350/00, but without built in loudspeaker.

LBB 3351/00

Table Top Chairmans Unit
. Built in loudspeaker and microphone.
. Microphone on/off button, pilot lamp and microphone "ON" indication lamp.
. Priority microphone function.
. Jack for headphone connection.

LBB 3451/00

Table Top Chairmans Unit
Identical to 3351/00, but without built in loudspeaker.

LBB 3305/00

Delegate´s extension cable
. Extends the connection between two delegate units, and/or between delegate´s unit and chairmans unit.

LBB 3221/00

6ch. interpreters desk
. Microphone signal amplifier, with AVC.
. Monitor section for headphone or loudspeaker.
. Switching circuit to allow the microphone- or floor signal to be switched to one of the chosen channels.
. Microphone mute switch.

LBB 3186/40
LBB 3186/70

Central control desk
. Central control of 40 respectively 70 delegate units.

2. BRIEF DESCRIPTION OF CSU AND PERIPHERALS
(see fig. 2 and 3.)

Discussion
Pressing the microphone button S1 on the delegate unit, the microphone signal is switched via a pre-amplifier to the audio line. The switching function is provided by the switching control circuit (SCC). The loudspeaker is automatically switched "OFF", and the microphone "ON" LED indication plus the pilot LED´s are switched "ON". After pressing the microphone button again, the microphone signal will be cut of the audio line.
The audio signal on the audio line has now been amplified by its associated audio amplifier, and applied to the loudspeaker. The SCC also switches the microphone LED and the pilot LED "OFF". The disable request line, from the central supply unit ensures that the maximum number of switched "ON" microphones (adjusted via S102 on the CSU) cannot be exceeded.
New delegates cannot switch on their microphones, because the SCC has been reset by the high active disable request line.

The audio level comparator in every delegate unit, compares the superimposed audio signal, with the microphone signal, i.e. when a delegate does not speak into his microphone for approximately 30 seconds, the microphone will automatically be switched "OFF".

Conference
When using the central control desk, the switching control circuit automatically ensures that the microphone button S1, is given the function of the microphone request button.
The SCC senses the central control unit, by a D.C. level on the remote control line. When the D.C. level is low, a central control desk is used and the signal from the microphone button is sent via the request line, to the central control desk, i.e. after a microphone has been requested, the request LED on the delegate´s unit, and the request lamp on the central control desk are switched "ON". By a high D.C. level on the remote control line to the delegate unit, the microphone will be switched on via the switching control circuit. The microphone "ON" LED and the pilot LED are switched "ON" and the request LED and loudspeaker are switched "OFF".
By switching on via the remote line, the delegate´s microphone can only be switched "OFF" by the remote line, or by the delegate himself using his microphone button.
The central control desk operator is also able to switch on a microphone remotely even when a delegate does not request it. After a while the microphone can be switched off by the operator.

Chairman

The chairman's unit has the same function as the delegate unit, switch S1 controls the on/off, and with the addition of a priority button S2, the chairman is able to gain priority with his microphone.

When S2 is pressed; and remains pressed, the switching control circuit switches "ON" the microphone, and simultaneously switches the microphones LED and pilot LED "ON". The loudspeaker will automatically be switched "OFF".

Pressing S2, allows a low D.C. level to be switched, ensuring that every delegate unit; control circuit is reset, causing the delegates units to be automatically switched "OFF"and their loudspeakers switch "ON".
Upon receiving the low DC level on the priority line, the central supply unit sends a priority attention signal to the audio line, causing a signal to be heard on every delegate unit allowing the chairman to gain priority.
Releasing the priority button S2, the chairman's microphone will be switched "OFF" and the loudspeaker switched "ON". The D.C. level on the priority line increases, causing the switching control circuits not to be reset, therefore all delegates can manually switch on their microphones as normal. The chairman's unit is not equipped with an audio level comparator, therefore his microphone is not automatically switched "OFF" when the delay time is exceeded.

Using the central control desk, the microphone request, function can be remotely controlled. The chairman must indicate to the operator of the central control desk, that he requires remote control.
The operator at the control desk, switches via the remote control line the chairmans request, for microphone "ON".

The central control desk operator is also able to switch on/off the chairmans microphone even when the chairman does not requests for it. When e.g. the chairman forgets to switch off his microphone the operator is able to carry out this function.

Handmicrophone

The hand-microphone is connected directly to the central supply unit by means of a plug-in unit. The plug-in unit has the same functions as the delegate unit but without a loudspeaker.
The microphone signal is switched from the pre-amplifier, via the connection panel to the audio line.

Basic Printed Circuit Board and Connector Panel

When the chairman requests priority, the D.C. level on the priority line is low (e.g. 1.5vdc), causing the oscillator on the basic print circuit board to be reset. The oscillator generates a priority tone via the summing pre-amplifer, and is then switched onto the audio line. In all the delegate loudspeakers, the priority tone will be heard.
Signals via the summing amplifier, line in, tape recorder, and telephone coupler are switched to the audio line. The summing amplifier mixes the applied input signals, and the resultant output signal is connected to the audio line.
The internal audio line is via X2-21, and via the attenuator circuit on the connector panel (S101), routed to the two delegate chains BU101, and BU104, and finally to the hand-microphone plug-in unit.

The audio line is amplified by three seperate amplifiers, A, B, and C. Amplifier A, amplifies the audio signal for the telephone coupler, amplifier B, for the line-out, and amplifier C for the tape recorder and interpreters monitor panel LBB 3301, (Floor Signal). Provision is also provided for superimposing the audio signal onto the D.C. level, for the disable request line. Tape-recorder, line-out, and telephone coupler outputs are provide via the connector panel to BU106, BU102, and BU105.
The disable request signal on the connector panel, is distributed into three directions, via BU101 for delegate chain 1, via BU104 for delegate chain 2, and internally to the hand-microphone plug-in unit. The floor signal, is routed via the connector panel to the interpreters monitor panel.

The audio line stabilizer on the basic print circuit board, stabilizes a DC level on the audio line to a constant value. Due to the load on the audio line, the feedback from the stabilizer is adjusted automatically, i.e. an increasing DC level is decreased, and a de-creasing level is increased.

The attenuator control circuit, provides a control signal to the 3db attenuator circuit on the connector panel. When two or more microphones are switched "ON" simultaneously. The input level of a comperator in the control circuit exceeds a certain reference level. The comperator then provides a control signal to the attenuator on the connector panel, which in turn is activated and attenuates the audio signal with 3db.

With S101 connected to the audio line it is possible to adjust the level from the audio for the loudspeakers and the line out signal in steps of 3dB.

The limiter limits the number of microphones which can be switched "ON" simultaneously, by transferring a DC level onto the disable request line, when the maximum number of microphones is reached. New speakers cannot switch "ON" their microphones as long as the number of microphones is at a maximum. The maximum number of microphones can be increased / decreased by adjusting S102 on the connector panel, located on the front side of the central control desk. S102 is a three positioned switch, allowing 1, 3, or 6 microphones to be added, provision is also provided for a control signal to switch "OFF" the audio level comparators, in every delegate's unit.

When a telephone coupler is used without a fork circuit, the telephone signal which is sent to the CSU, amplified and returned to the telephone line cannot be suppressed. In general this means that the telephone signal is automatically fed back to the telephone. To avoid this problem the fed back telephone signal can be reduced to almost 0 by placing a jumper in the right position. (side tone reduction).

Interpretation

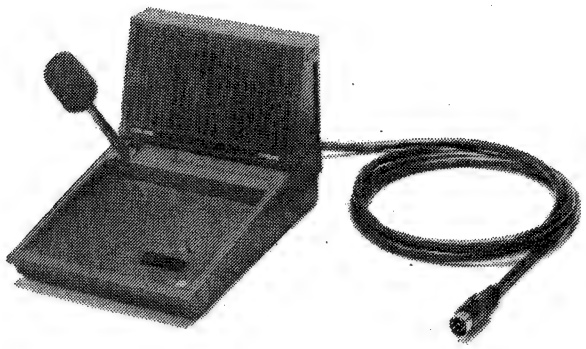
Six channels, the auto-floor, floor, and communication signal are transferred via BU207, connected between the interpreters desks and the interpreters monitor panel LBB 3301. The audio signal from the connector panel is on the int/mon panel, connected via a seperate transformer to the floor line. On the same panel Ch.1/Ch.6, floor and communication are routed via BU209 to the transmitter.
Internally this signal plus the auto-floor are connected to the Monitor Distribution Board LBB 3203/00.
The amplified floor plus Ch.1/Ch.6 are routed via the int/mon panel and back to BU208.
Via connector BU208, a maximum number of 1000 program selectors can be used, to monitor the channels and the floor.

A channel occupied circuit on the int/mon panel, provides LED information to the transmitters connector BU209 and the remote connector BU210. When a channel is occupied, the DC level on the channel line falls below a certain DC level, causing the output of a comparator in the channel occupied circuit to go high, this condition is used to switch "ON" an LED which corresponds to that channel number. The LED information can be derived from BU209 and BU210 in customer made applications.

Transferring a BCD code onto the address lines, via BU210 to the monitor selector on the Monitor Distribution Board, one of the channels, floor or auto-floor can be selected and amplified with the communication signal in the mixing amplifier. The amplifier output is routed via the int/mon panel to the remote socket BU210, and can be used for monitoring loudspeakers.

LBB 3350/00 Table Top Delegate Unit

LBB 3450/00 Table Top Delegate Unit.



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Figures.

1. INDTRODUCTION DELEGATE UNIT

The delegate unit can be divided into 4 parts (see block diagram fig. 1.)

Part 1 Microphone Amplifier
Amplifies the microphone input signal, and switches it to the audio line.

Part 2 Audio Amplifier
Amplifies the audio signal, and distributes it to the loudspeaker and headphone jack.

Part 3 Auto switch off circuit
Compares the audio signal, and the microphone signal. Automatically switches "off" the microphone, when there is no input from the delegate for approximately 30 to 45 seconds.

Part 4 Microphone and loudspeaker Switching Circuit
Switches the microphone and loudspeaker on/off, depending on the status of the control signals. The control signals comprise of the Microphone, remote, priority and disable request signals, plus the output signal from the Auto switch off circuit.

2. CIRCUIT DESCRIPTION DELEGATE UNIT

(see Circuit diagram Fig. 2 and 3)

When the system is switched "on", capacitor C33 charges to the supply voltage 27v. Resistors R48, and R50 cause the voltage on the + input 5 of IC3b to the lower, than on the negative input 6. This state is valid until the power supply voltage reaches 14v.
The difference negative voltage, between the negative input and the positive input of IC3, causes the comparator output to be 0v. The 0v is applied to the negative input 2 of IC3a, because the voltage on the positive input 3 is +6v, the comparator output will be high i.e. logic "1". Logic "1" resets the flip flop IC5a. Switching on the system, the supply voltage exceeds 14v, the zener diode D11 will conduct, causing the voltage at input 6, to be left at a constant level of 15v. If the power supply voltage exceeds 20v, the voltage at the input of IC3b pin 5, is higher than the 15v on the input 6 causing a positive difference voltage, ensuring that the comparator no longer clamps the voltage to zero.
15v is applied to the negative input of IC3a, pin 2, which is higher than the +6v on the positive input 3, therefore the output from the comparator is 0v, is logic "0". Logic "0" will no longer reset the flip flop IC5, and the delegate unit is now "ready" for use.

Switching Control Circuit General

The switching control circuit IC5a, IC2d, IC3a, and IC4a/b carries out all the switching functions in the delegate unit. Switching is due to the state of the call microphone signal, priority-, disable request, and remote control lines, the microphone signal or the audio signal to the loudspeaker. IC5a is a flip flop, who's output is logic "0"(0v) or logic "1" (15v) depending on its input signals. When the output is 0v, the microphone signal is switched "off" from the pre-amplifier to the audio line. When the output is 15v, the microphone signal via the pre-amplifier, will be switched to the audio line, and the loudspeaker is switched "off".

The priority and disable request line are via a comparator circuit, connected to the reset and data input. The priority signal, when active, ensures that the flip flop will be reset, and the active disable request signal ensures that the data input becomes "0". The microphone call signal, from the microphone button, is applied to the clock input of IC5, and the microphone remote call signal to the set input. The clock or set pulse can make the flip flop output logic "1" (15v), causing the microphone to be switched "on" and the loudspeaker "off".

The audio comparator output, is connected via a comparator to the reset input of IC5. Therefore after the delay time of approximately 30 to 45 seconds, the flip flop will be reset, and the switched "on" microphone is then switched "off".

Listening

In the listening position, the switching control circuit, switches via the loudspeaker switching circuit, the audio signal, to the audio amplifier and to the loudspeaker. The microphone switching circuit is inactive, because the microphone signal is not connected to the audio line. During listening, the clock input of IC5 is low (logic "0") because the call button has not been pressed. Because their is no priority, the priority line is at 27v. The voltage on the negative input 2 of IC3a, via D9 R31 and R36 is approximately 12v., because the positive input is 6v, the comparator output is 0v, logic "0". Logic "0" is connected to the reset input of IC5. The disable request, connected to pin 13 of IC2d is inactive, therefore the negative input is approximately 0v. The positive input to IC2d pin 12 is positive 10v, therefore the comparator no longer clamps the voltage on the data input to zero. At last their is no remote control, meaning that the remote line which is connected to the set input of IC5 is about 0v. This logic "0" does not set the flip flop.
The output of the flip flop, which is at 0v, is connected via a resistor and capacitor network, to transistor TS5, this circuit forms the microphone switching circuit. 0v on the base of TS5, causes it to not conduct, therefore TS4 which is part of the pre-amplifier is also non-conductive. The microphone signal on the base of TS4 therefore does not reach the audio line, and acts as if it were switched "off".
The loudspeaker switching circuit, consists of TS1, relay K1, and associated components. The 0v from the flip flop output, is applied to the base of TS1, causing it to be non-conductive, therefore no current flow through the relay coil, and the relay is not activated. In this state the contacts are closed, causing the audio signal via the audio amplifier to be applied to the loudspeaker.

Audio Amplifier

The amplifier consists of $IC1^{b}$, TS6, TS7, and associated components. The audio signal from the audio line is fed via C9 and R19 to the positive input of $IC1^{b}$, the ground reference is fed to the negative input. The operation amplifier, amplifies the microphone signal, the output is a DC level of approximately 14 volts, on which the audio signal is superimposed. The balanced output stage, TS7 and TS6 provide, the current for driving the low impedance loudspeaker.

Loudspeaker unit (only in LBB 3350/00)

In the listening position 0v is applied, via X1-5, to the base of TS1, therefore no current flow through the relay coil and the relay is not activated. In this state the contacts are closed via X1-2. The audio signal is applied to the loudspeaker, X1-1 is connected to ground. Because no current flow through the relay coil, the pilot leds D1 until D4 inclusive are not illuminated. In the call position approximately 15v is applied, via X1-5, to the base of TS1, therefore current flow from +15v at X1-6 via the relay coil to ground (X1-4). In this "active state" the relay contacts are opened. The audio signal at X1-2 cannot reach the loudspeaker. The current through D1 until D4 inclusive cause these pilot leds to illuminate.

TS2 and associated circuitry provide for a fast switch over from listening position to call position. At the moment TS1 becomes inductive the current flowing via the pilot leds through the coil of relay K1 is high enough to open the contacts in a "normal" way. When TS1 is not conductive, C1 is charged. The voltage applied via R2 and R3 to the base of TS2 ensures that this transistor is conductive. But because of the non conductive state of TS1 no current can flow via TS2 through K1 to ground.

At the moment the system switches over from listening position to call position, TS1 becomes conductive and current flows via the pilot leds through the relay coil and TS1 to ground. Extra current also flows via TS2 through the relay coil and TS1 to ground. This "extra" current, which only flows for a short moment, ensures that the magnetic field caused by the relay coil is "extra" strong and therefore opens the relay contacts "extra" fast.

This "extra" current may only flow for a short moment through the relay coil. At the moment TS1 becomes conductive. The charged capacitor C1 is connected to ground, C1 discharges via D12 and R1. The voltage over the capacitor decreases, therefore the voltage over R2 and R3, causing the base voltage of TS2 to increase. TS2 becomes less conductive.
The current through the relay coil decreases but remains enough (current via pilot leds) to keep the contacts opened.

Call Position

In the call position, the microphone switching circuit is activated, by the switching control circuit. The microphone signal is fed via the pre-amplifier and switched to the audio line. The loudspeaker is fed via the loudspeaker switching circuit, and switched "off" from the audio amplifier.

During a call, the clock input of IC5 is logic "1" (15v), because the call button is pressed "in". No priority or remote signals are present, therefore the reset input and the set input are at logic "0". Because disable request is inactive, the data input of IC5 stays 15v, (logic "1"). The data input is high, and the output of the flip flop will be logic "1", (15v) on the positive edge of the clockpulse, caused by pressing the "call button". The inverse flip flop output is now "0", this output is fed back to the data input, which also becomes "0". This means that the next clockpulse (S1) will reset the flip flop. The 15v on output 1 is applied to the base of TS5 in the microphone switching circuit. The transistor is conducting, causing TS4 also to conduct, current can now flow, via the emmitter of TS4 to ground. The microphone signal is taken from the collector, the microphone LED illuminates, due to the current through TS4. The 15v on the output of IC5, via the base of TS1 in the loudspeaker switching circuit, ensures that the transistor conducts. The current which now flows through the relay to ground, allows the contacts to open and the loudspeaker is switched "off" from the audio amplifier, also a current is flowing through the pilot LEDs causing it to illuminate.

Pre-Amplifier

The pre-amplifier consists of IC1a, TS4 and associated components. A DC voltage is fed via TS1 and applied to the electret microphone line. The current flowing from TS1 to the electret microphone, ensures that the "FET" inside the microphone is conducting. The analogue microphone signal, is also applied to the microphone line, by the microphone itself, and fed via C1 and C2 to the + and - input of the operational amp. IC1a. C1 ensures that the DC voltage for the electret microphone, cannot reach the input of the Op amp. A DC voltage of approximately 4v is fed via R5, and R6 and R8 to the analogue microphone signal on the inputs of IC1a. C2 ensures that this DC voltage is not influenced by TS2 and TS3. The output signal of the Op amp. IC1a if fed back via R11/C48 to the -input and via the resistor between X2-5 and X2-6. The resistance value is dependant, on the sensitivity of the electret microphone. In this way differences in sensitivity of the microphones are compensated. The amplified signal, a DC level of approximately 10v on which the audio signal is superimposed, from the Op amp is applied to the base of TS4.

Limiter

The limiter consists of TS2, TS3,and associated components. When the output signal of the Op amp IC1a reaches a value greater than ± 0.7v, D1 or D2 conduct, and so will TS2 or TS3. When either of these two transistors is conducting, the input signal from the pre-amplifier decreases. A sample of the current from the analogue microphone signal is then flowing via the conducting transistors to ground. The microphone signal is now limited.
The limiter is divided into two sections, the right section D2 and TS3 is for the positive AC part of the output signal, and the left section D1 and TS2, for the negative AC output signal.

Resetting "Call" Position

If the call button S1 is pressed again, IC5 receives another positive pulse on its clock input. The inverse output pin 2, was "0", and so the data input of IC5. After the clockpluse, the output pin 1, becomes "0", because the data input is "0". Output 2 is the inverse of output 1, is logic "1", therefore the data input is "1" again. The logic "0" at output 1, activates the loudspeaker switching circuit, and cause the microphone switching circuit to become in-active.
The 0v present on the base of TS1, ensures that it is not-conducting. The loudspeaker is fed via the relay contacts, connected to the audio amplifier. Transistor TS5 is not conducting, due to the 0v on its base, from the output of IC5. Therefore the microphone signal on the base of TS4, is not switched to the audio line.

Priority

When the chairman wants priority over the delegate microphones, the priority line becomes about 1,5V. Due to R37 and R99 1V is applied to the -input of IC3a then.
Because the 6V on the +input the comperator output is about 15V which is logic "1". Via the reset input IC5 is now reset. The set input stays "0" and the data input "1". The flip flop output was "1", due to the reset the output becomes "0". The microphone signal is switched off by TS5 which is now nonconductive because of the 0V on its base.
The loudspeaker is by TS1 switched to the audio amplifier via the relais contacts.
As long as the priority line is 1,5V the reset input stays "1" and the flip flop resetted, pushing the call button does not influence the switching control circuit. The delegate can not switch on his microphone with his call button.

When the chairman resets his priority, the priority line becomes 27v, 27v is then fed to the -input of the comparator IC3a. Because the +input is 6v, the output is 0v, is logic "0", therefore IC5 is no longer reset. The delegate unit will now be in its normal listening position. Therefore the delegate is able to switch on/off his microphone via the call button.

Disable Request

When the adjusted number of microphones, are switched "on" (1, 3 or 6 via switch S102) simultaneously. The disable request line reaches approximately 27v. This 27v is applied to the -input of IC2d. Because the +input is connected to 10v the output of the comparator becomes 0v. The data input which is at 15v, is then brought down to approximately 1v, due to the forward voltage on the diode D13. This 1v is logic "0" to the flip flop. When the microphone is swiched "on", during the disable request, the data input is already at "0", because the inverse flip flop output is at 0v. During the disable request, the switched "on" microphones can be switched "off" by pressing the call button. The positive pulse on the clock input, clocks the data which is at "0", to the output. During the disable request, a microphone cannot be switched "on", because the data input is set to "0". The call pulses from the call button, only switches a "0" to the flip flop output.

When the number of switched "on" microphones, is less than the maximum number, adjusted by switch S102, the disable request line becomes 0v.
The output from the comparator IC2d is now not longer clamping the data input to zero. The delegate unit is now in the listening position, and the delegate is now able to switch "on" his microphone, by pressing his call button.

Remote Control

When a Central Control Desk is used in the system, the call button can also be used as a microphone request button. This can only be achieved, when the control desk is in the manual mode.

Three situations exist :
1. No Central Control desk connected.
2. Central Control desk connected, and positioned in the auto mode.
3. Central Control desk in the manual mode.

When a central control desk is connected in the auto mode, the remote line is higher than 2/3v+. When no desk is connected, resistor R38 which is connected to v+ (27v) ensures that the remote line is higher then 2/3 v+.
The remote line is fed via C29, and connected to the set input of the flip flop. C29 ensures that the DC voltage is blocked and the set input is "0". The delegate is able to switch "on" or "off" his microphone via the call button, as normal.
When the central control desk is in the manual mode, the voltage on the remote line is lower than 2/3 v+. The flip flop IC5a, is not set, due to capacitor C29. Because the -input of IC4a is 2/3v+, the output is now 0v.

When the delegate presses his call button, the output of IC5a becomes 15v, but is clamped by the comparator IC4a. The voltages on the anode of the "request" LED D10 is approximately 1v, therefore the LED illuminates. The 15v on the output of the flip flop, is also applied to the base of TS9, which causes it to conduct. Current flows now from the request line, this is then a sign for the central control desk that a request is made. The operator of the central control desk, makes the remote line higher then 2/3v+, the output of the comparator IC4a then becomes 15v. The voltage at R59 is no longer decreased, therefore the 13v is applied to the base of TS5. The microphone will be switched "on" and via TS1 the loudspeaker "off".

The operator is also able to switch "on" a delegate microphone, even when the delegate doesn´t request it. The voltage on the remote line, is now switched from a value much lower than 2/3v+, to a value greater than 2/3v+ (about v+). Because of the fast rise time, and the high voltage step, this pulse passes the differentiation network C29 and R45 and sets the flip flop IC5 via the set input. The output of the flip flop is now 15v, and the microphone is switched on as long as the remote line remains high.

The operator is able to swith "off" the microphone, by switching the voltage on the remote line from a value greater than 2/3v+ (approx. v+), to a voltage much less than 2/3v+, via C26 the - input of IC3a, which is 27V when there is no priority, is decreased for a short moment, causing the voltage at the input to decrease below 6v, and the comparator output then becomes 15v. This pulse then resets the flip flop, and the microphone is then switched "off" and the delegate is in the normal listening position.

When the central control desk is used, the priority line from the chairmans´ unit is not connected to the other delegate units, but to the central control desk. When a chairman presses his "priority button", two situations exist : the central control desk is in manual, or in the auto mode.
In "manual mode", the central control desk generates a DC level, which is higher than 6v, but lower than 2/3v+ (18v), on the priority line. This voltage is then applied to the +input of IC4b, ensuring that the comparators output is 0v. When the microphone is switched "on" the 13v on the anode of D10 and resistor R59 is decreased, and the microphone is switched "off".
When the priority button is released by the chairman, the priority line becomes approximately 27v, the output of IC4b 15v, and therefore the voltage on the anode of D10 is no longer decreased and remains at 13v, and the microphone is switched "on" automatically. i.e. when the central control desk is in manual mode, priority from the chairman doesn´t switch "off" the microphone, only "mutes" it during the priority call.

In the "auto mode" the microphone is switched "off" whilst the chairman has priority, and remains switched "off" when the priority button is released. In "auto mode", the central control desk, generates a DC level lower than 6v on the priority line, after a priority call. This voltage is then applied to the -input of IC3a, because the +input is at 6v, the comparators output is 15v, flip flop IC5a resets. The microphone is switched "off". When the priority is released, the priority line goes to 27v. The output of IC3a is now at 0v, and the flip flop is no longer reset, the microphone remains switched "off", and the delegate unit is now in the listening position.

Audio Level Comparator

The audio level comparator, ensures that when a delegate does not speak into his microphone for approximately 30 to 45 seconds, the flip flop IC5, fed via comparator IC3a, will be reset.

At input 3 of IC2a, a DC level of approximately 9v is applied. The microphone signal is applied to the -input 2 of IC2a. The Op. amp IC2a, subtracts the microphone signal from the DC level, and amplifies the resulting signal. The output signal is now at a 9v DC level, which is used to superimpose the amplified microphone signal on. This signal is then applied to the -input of IC2b and at input 5, the disable request signal. The disable request signal, plus a DC level from R28 on the disable request signal, together form a 9v DC level on which the audio signal (other delegates + delegate itself) is superimposed. IC2b subtracts the output of IC2a, which is the 9v on which the microphone signal is superimposed, from the 9v on which the audio signal is superimposed. The output 7, of IC2b is at a DC level of 9v, on which the difference between the audio- and the microphone signal is superimposed. The difference voltage, can reduce the voltage on x, and the output of IC2a, which is the 9v on which the microphone signal is superimposed, can reduce the voltage on Y. When only the the delegate is using his unit, the audio signal is the same as the microphone signal. The Ac difference voltage at the output of IC2b is 0v, only the 9v DC level is on the output. The voltage on x is now 9v plus the forward voltage of D6, adding up to a total of approximately 10v.
When more than one delegate is speaking, the audio signal is higher than the microphone signal. On the output of IC2b, the difference voltage, superimposed on the 9v DC is applied, the negative going voltage of the AC difference signal, ensures that the 10v on x is decreased via D6 and C21.

If the delegate unit is silent, there is no microphone signal, therefore the AC voltage on the 9v DC level at the output of IC2a is at 0v. The voltage at Y is at 9v plus the forward voltage of D7, which in total sums up to approximately 10v. When the delegate microphone is in use, the microphone signal is amplified by IC2a. The negative going voltage of this microphone signal, ensures, that the 10v on Y is decreased, via D7 and C22.

X is applied to the +input of IC2c, and Y to the -input. When X is greater than Y, the output of the Op amp is approximately 15v, and when Y is greater than X the output is 0v. Therefore when the delegate uses his microphone (he has to speak louder when others are using their microphone), the output of IC2c is 15v, C24 is now charged to 15v, because D9 is conducting. When the delegate stops using his microphone the output becomes 0v. Instantly C24 discharges via R35, and the DC level slowly decreases. This decreasing voltage is then fed via R36, and applied to the -input of IC3a. When the voltage becomes lower than approximately 7v, the comparator output which was at 0v, now becomes 15v, and resets the flip flop IC5a, and the microphone will now be switched "off".

The time taken for C24 to discharge, from 15v to approximately 7v is about 30 to 45 seconds. When the microphone is switched "off", the output of IC2c becomes 15v, independant of the number of other switched on microphones. This is because Y is approximately 1v when the delegates unit is not switched "on". The 0v on the output of IC5a, is applied to D8, therefore C22 can only discharge, until the voltage on Y reaches the forward voltage of D8 which is approximately 1v. This forward voltage cannot be exceeded, as long as 0v is applied to the cathode of D8. When the delegate unit is switched "on", by the delegate pressing his call button, then approximately 13v is applied to the cathode of diode D8. C22 can now partly discharge, and the voltage on Y increases to approximately 10v, because of the 9v DC on the cathode of D7, and its forward voltage of approximately 1v.

By placing the jumper S3, in the b-a position, capacitor C24 cannot discharge via R35, therefore the audio level comparator is in-active.

Switching S102, the audio level comparator can be made in-active. In the three position 1, 2, or 6 microphones in non-auto, the switch supplies 0v to the ground reference which is normally 9v DC. This 0v is fed via R30 and C20, to the -input of IC2b and overrules the output signal from IC2a. The output of IC2b is now 0v, therefore X is at 10v. IC2c output, is and remains 15v, therefore the capacitor which is charged, discharges, and the audio level comparator is in-active.

The different switching functions in the delegate unit are listed in the table below.

Function	Set	Data	Clock	Reset	Q	mic switch. signal.	mic	LS
Listening	0	1	0	0	0	0	off	on
Call	0	↓	↓	0	1	1	on	off
Reset call = listening	0	↓	↓	0	0	0	off	on
Priority on	0	1	X	1	0	0	off	on
Priority off = listening	0	1	X	0	0	0	off	on
Call	0	↓	↓	0	1	1	on	off
Reset call = listening	0	↓	↓	0	0	0	off	on
Disable request on	0	0	X	0	0	0	off	on
Disable request off	0	1	X	0	0	0	off	on
Call	0	↓	↓	0	1	1	on	off
Reset call = listening	0	↓	↓	0	0	0	off	on
Call by use of central control desk = request (manual mode)	0	↓	↓	0	1	0	off	on
Remote control on (after request)	0	1	X	0	1	1	on	off
Remote control off (= reset call)	0	↓	↓	0	0	0	off	on
Remote control on (no request)		↓	X	0	1	1	on	off
Remote control off	0	↓	X	⊓	0	0	off	on
Microphone off by Audio level comperator	0	↓	X	⊓	0	0	off	on

3. SPARE PART LIST

Spare parts list of Delegate Unit LBB 3350

	Description	Code Number
	Grommet	5322 462 40211
	Jack for headphone	5322 268 10202
	Delegate cable	5322 321 21658
	Plug X13	5322 268 44142
	Spring for microphone stem	5322 492 63142
	Plug X2	5322 268 44152
	Microphone	5322 242 20094
	Cap for microphone	5322 462 40728
	Foam cap for microphone	5322 462 40731
	Cap.chip 100 PF 5% 50V for microphone	4822 122 31765
	Socket X13	5322 268 24041

Spare Parts list PCB Delegate

	Description	Codenumber
	Knob push button S1	5322 414 10014
	Rubberplate S1	5322 466 91584
C 1	Cap.chip 10NF	4822 122 32442
C 2	Cap.ceramic 100NF10%X7R 50V	5322 122 32839
C 3	Cap.electrolyt 10UF 20% 25V	4822 124 21732
C 4	Cap.electrolyt 4,7UF 20% 25V	5322 124 21966
C 5	Cap.electrolyt 0,47UF 20% 25V	4822 124 21453
C 6	Cap.electrolyt 4,7UF 20% 25V	5322 124 21966
C 7	Cap.electrolyt 47UF 20% 10V	5322 124 21975
C 8	Cap.electrolyt 4,7UF 20% 25V	5322 124 21966
C 9	Cap.chip 3,3NF 10% 50V	4822 122 31969
C 10	Cap.ceramic 100NF10%X7R 50V	5322 122 32839
C 11	Cap.chip 47PF 5% 50V	4822 122 31772
C 12	Cap.chip 100PF 5% 50V	4822 122 31765
C 13	Cap.chip 100PF 5% 50V	4822 122 31765
C 14	Cap.electrolyt 22UF 20% 25V	4822 122 31969
C 15	Cap.electrolyt 4,7UF 20% 25V	5322 124 21966
C 17	Cap.ceramic 100NF10%X7R 50V	5322 122 32839
C 18	Cap.ceramic 82NF 10% 50V	5322 122 32838
C 20	Cap.electrolyt 10UF 20% 25V	4822 124 21732
C 21	Cap.electrolyt 4,7UF 20% 25V	5322 124 21966
C 22	Cap.electrolyt 4,7UF 20% 25V	5322 124 21966
C 23	Cap.chip 100PF 5% 50V	4822 122 31765
C 24	Cap.electrolyt 100UF 50% 25V	4822 124 20701
C 25	Cap.chip 100PF 5% 50V	4822 122 31765

C 26	Cap.chip 4,7NF10%X7R	25V	4822 124 21966
C 27	Cap.ceramic 100NF10%X7R	50V	5322 122 32839
C 28	Cap.chip 10NF		4822 122 32442
C 29	Cap.chip 4,7NF10%X7R	50V	4822 122 31784
C 30	Cap.chip 100PF 5%	50V	4822 122 31765
C 31	Cap.chip 100PF 5%	50V	4822 122 31765
C 32	Cap.electrolyt 47UF 50%	25V	4822 124 20699
C 33	Cap.electrolyt 47UF 50%	40V	4822 124 20713
C 35	Cap.electrolyt 22UF 20%	25V	4822 124 20646
C 36	Cap.electrolyt 47UF 50%	25V	4822 124 20699
C 40	Cap.ceramic 100NF10%X7R	50V	5322 122 32839
C 44	Cap.ceramic 100NF10%X7R	50V	5322 122 32839
C 45	Cap.ceramic 100NF10%X7R	50V	5322 122 32839
C 47	Cap.chip 22NF 10%	63V	4822 122 31797
C 48	Cap.chip 470PF 5%	63V	4822 122 31727
D 1	Diode BAV70		5322 130 34331
D 2	Diode BAV70		5322 130 34331
D 3	Diode, Reference BZX84-C5V1		5322 130 32835
D 4	Diode CQW54-V1		5322 130 32704
D 5	Diode BAV70		5322 130 34331
D 6	Diode BAV70		5322 130 34331
D 7	Diode BAV70		5322 130 34331
D 8	Diode BAV70		5322 130 34331
D 9	Diode BAV70		5322 130 34331
D 10	Diode, Reference TIUG164		5322 130 32587
D 11	Diode BZX84-C15		5322 130 33662
D 12	Diode BAV70		5322 130 34331
D 13	Diode BAV70		5322 130 34331
D 17	Diode BAV70		5322 130 34331
D 19	Diode, Reference BZV46-2V0		4822 130 31248
D 20	Diode, Reference BZX79-B3O		4822 130 34328
IC 1	Integr.circuit LF353N		5322 209 81395
IC 2	Integr.circuit LM324D		5322 209 71598
IC 3	Integr.circuit LM393D		PHIN 5322 209 71599
IC 4	Integr.circuit LM393D		PHIN 5322 209 71599
IC 5	Integr.circuit HEF4013BT		5322 209 14477
R 1	Res.chip 10K 2% 0,125W		4822 111 90249
R 2	Res.chip 47K 2% 0,125W		4822 111 90543
R 3	Res.chip 39OE 2% 0,125W		5322 111 90138
R 4	Res.chip 10K 2% 0,125W		4822 111 90249
R 5	Res.chip 47K 2% 0,125W		4822 111 90543
R 6	Res.chip 33K 2% 0,125W		5322 111 90267
R 7	Res.chip 1K 2% 0,125W		5322 111 90092
R 8	Res.chip 22OK 2% 0,125W		4822 111 90197
R 9	Res.chip 22OE 2% 0,125W		4822 111 90178

R 11	Res.chip 10K 2% 0,125W	4822 111 90249
R 12	Res.chip 100K 2% 0,125W	4822 111 90214
R 13	Res.chip 10K 2% 0,125W	4822 111 90249
R 14	Res.chip 560E 2% 0,125W	5322 111 90113
R 15	Res.chip 100K 2% 0,125W	4822 111 90214
R 16	Res.chip 1K5 2% 0,125W	4822 111 90151
R 17	Res.chip 12K 2% 0,125W	4822 111 90253
R 18	Res.chip 1M 5% 0,125W	5322 111 90094
R 19	Res.chip 100K 2% 0,125W	4822 111 90214
R 20	Res.chip 18K 2% 0,125W	4822 111 90238
R 21	Res.chip 100E 2% 0,125W	5322 111 90091
R 22	Res.chip 100K 2% 0,125W	4822 111 90214
R 23	Res.chip 22K 2% 0,125W	4822 111 90251
R 24	Res.chip 100K 2% 0,125W	4822 111 90214
R 25	Res.chip 470E 2% 0,125W	5322 111 90109
R 26	Res.chip 18K 2% 0,125W	4822 111 90238
R 27	Res.chip 39K 2% 0,125W	5322 111 90108
R 28	Res.chip 100K 2% 0,125W	4822 111 90124
R 29	Res.chip 27K 2% 0,125W	4822 111 90542
R 30	Res.chip 220K 2% 0,125W	4822 111 90197
R 31	Res.chip 18K 2% 0,125W	4822 111 90238
R 32	Res.chip 1M 5% 0,125W	5322 111 90094
R 33	Res.chip 1M 2% 0,125W	5322 111 90094
R 34	Res.chip 1K 2% 0,125W	5322 111 90092
R 35	Res.chip 220K 2% 0,125W	4822 111 90197
R 36	Res.chip 100K 2% 0,125W	4822 111 90214
R 37	Res.chip 1M 5% 0,125W	5322 111 90094
R 38	Res.chip 10M 5% 0,125W	5322 111 91141
R 39	Res.chip 100K 2% 0,125W	4822 111 90214
R 40	Res.chip 100K 2% 0,125W	4822 111 90214
R 41	Res.chip 100K 2% 0,125W	4822 111 90214
R 42	Res.chip 1K 2% 0,125W	5322 111 90092
R 43	Res.chip 100K 2% 0,125W	4822 111 90214
R 44	Res.chip 1M 5% 0,125W	5322 111 90094
R 45	Res.chip 100K 2% 0,125W	4822 111 90214
R 46	Res.chip 47K 2% 0,125W	4822 111 90543
R 47	Res.chip 1K 2% 0,125W	5322 111 90092
R 48	Res.chip 100K 2% 0,125W	4822 111 90214
R 49	Res.chip 100K 2% 0,125W	4822 111 90214
R 50	Res.chip 27K 2% 0,125W	4822 111 90542
R 51	Res.chip 68K 2% 0,125W	4822 111 90202
R 52	Res.chip 33K 2% 0,125W	5322 111 90267
R 53	Res.chip 100K 2% 0,125W	4822 111 90214
R 54	Res.P.T.C.	5322 116 44008
R 55	Res.chip 100K 2% 0,125W	4822 111 90214

R 56	Res.chip 15K 2% 0,125W		4822 111 90196
R 57	Res.chip 15K 2% 0,125W		4822 111 90196
R 58	Res.chip 12K 2% 0,125W		4822 111 90253
R 59	Res.chip 2K7 2% 0,125W		4822 111 90569
R 60	Res.chip 100K 2% 0,125W		4822 111 90214
R 72	Res.chip 10K 2% 0,125W		4822 111 90249
R 82	Res.chip 3K9 2% 0,125W		4822 111 90571
R 83	Res.chip 3K9 2% 0,125W		4822 111 90571
R 86	Res.chip 220K 2% 0,125W		4822 111 90197
R 92	Res.chip 82K 2% 0,125W		4822 111 90575
R 93	Res.chip 68K 2% 0,125W		4822 111 90202
R 94	Res.chip 680K 2% 0,125W		4822 111 90162
R 95	Res.chip 100K 2% 0,125W		4822 111 90214
R 96	Res.chip 5K6 2% 0,125W		4822 111 90572
R 97	Res.chip 100K 2% 0,125W		4822 111 90214
R 98	Res.metal film 390E 5% 2,5W		5322 116 54401
R 99	Res.chip 10K 2% 0,125W		4822 111 90249
R 102	Res.chip 1M 5% 0,125W		5322 130 42755
R 103	Res.chip 100K 2% 0,125W		5322 111 90094
S 3	Pin		5322 535 84341
S 3	Link,jumper 76264 101 Berg		5322 290 60298
SK 1	Switchmechanism S1 mic. button		5322 278 14006
TS 1	Transistor BC847C	PHIN	5322 130 42755
TS 2	Transistor BC857C	PHIN	5322 130 42756
TS 3	Transistor BC847C	PHIN	5322 130 42755
TS 4	Transistor BC847C	PHIN	5322 130 42755
TS 5	Transistor BC847C	PHIN	5322 130 42755
TS 6	Transistor BC817-40		4822 130 42615
TS 7	Transistor BC807-40	PHIN	5322 130 60123
TS 8	Transistor BC817-40		4822 130 42615
TS 9	Transistor BC817-40		4822 130 42615
X 5	Socket,male		5322 265 64078

Spare parts list unit cable assy

Description	Code Number
Connector Hirschmann MAS88S	5322 265 40535
Plug X3	5322 267 74025
Socket X3	5322 268 24041
Bracket for X3	5322 462 44161

Spare parts list Loudsp. enclosure CCS400

Description	Code Number
Loudspeaker AD3371/Y150	4822 240 30172
Plastic lens on rear side	5322 381 10785
Plug X1	5322 268 44152
Bracket for X1	5322 462 44161

Spare parts list Printed board assy

	Description	Code Number
C 1	Cap.electrolyt 470NF 50% 63V	4822 124 20719
D 10	Diode BAV70	5322 130 34331
D 11	Diode BAV70	5322 130 34331
D 12	Diode BAV70	5322 130 34331
K 1	Relay	5322 280 80524
R 1	Res.chip 22K 2% 0,125W	4822 111 90251
R 2	Res.chip 22K 2% 0,125W	4822 111 90251
R 3	Res.chip 10K 2% 0,125W	4822 111 90249
TS 1	Transistor BC847C	5322 130 42755
TS 2	Transistor BC857C	5322 130 42756

Plug X13 can be used also as plug for X5.
Plug X2 can be used also as plug for X4.
The socket X3 can also be used as socket X2, X1 or X4.
The brackets for plug X1 or X3 can also be used in the plugs X2, X4, X5 and X13.

Recommended spare parts list of delegate unit LBB 3350

	Description	Code Number
	Grommet	5322 462 40211
	Jack for headphone	5322 268 10202
	Delegate cable	5322 321 21658
	Plug X13	5322 268 44142
	Spring for microphone stem	5322 492 63142
	Plug X2	5322 268 44152
	Microphone	5322 242 20094
	Cap for microphone	5322 462 40728
	Foam cap for microphone	5322 462 40731
	Cap chip 100 PF 5% 50V for microphone	4822 122 31765
	Socket X13	5322 268 24041

Spare parts list PCB delegate

	Description	Code Number
	Knob push button S1	5322 414 10014
	Rubber plate S1	5322 466 91584
D 3	Diode, Reference BZX84-C5V1	5322 130 32835
D 4	Diode CQW54-V1	5322 130 32704
D 10	Diode, Reference TIUG164	5322 130 32587
D 11	Diode BZX84-C15	5322 130 33662
D 19	Diode, Reference BZV46-2V0	4822 130 31248
D 20	Diode Reference BZX79-B30	4822 130 34328
IC 1	Integr. circuit LF353N	5322 209 81395
IC 2	Integr. circuit LM324D	5322 209 71598
IC 3	Integr. circuit LM393D	PHIN 5322 209 71599
IC 4	Integr. circuit LM393D	PHIN 5322 209 71599
IC 5	Integr. circuit HEF4013BT	5322 209 14477
SK1	Switchmechanism S1 mic. button	5322 278 14006
TS 1	Transistor BC847C	PHIN 5322 130 42755
TS 2	Transistor BC857C	PHIN 5322 130 42756
TS 3	Transistor BC847C	PHIN 5322 130 42755
TS 4	Transistor BC847C	PHIN 5322 130 42755
TS 5	Transistor BC847C	PHIN 5322 130 42755
TS 6	Transistor BC817-40	4822 130 42615
TS 7	Transistor BC807-40	PHIN 5322 130 60123
TS 8	Transistor BC817-40	4822 130 42615

TS 9	Transistor BC817-40	4822 130 42615
X 5	Socket male	5322 265 64078

Spare parts list unit cable assy

	Description	Code Number
	Connector Hirschmann MAS88S	5322 265 40535
	Plug X3	5322 267 74025
	Socket X3	5322 268 24041
	Bracket for X3	5322 462 44161

Spare parts list loudsp. enclosure CCS400

	Description	Code Number
	Loudspeaker AD3371/Y150	4822 240 30172
	Plastic lens on rear side	5322 381 10785
	Plug X1	5322 268 44152
	Bracket for X1	5322 462 44161

Spare parts list Printed Board assy

	Description	Code Number
K 1	Relay	5322 280 80524
TS 1	Transistor BC847C	PHIN 5322 130 42755
TS 2	Transistor BC857C	PHIN 5322 139 42756

Plug X13 can be used also as plug for X5.
Plug X 2 can be used also as plug for X4.
The socket X3 can also be used as socket X2, X1 or X14.
The brackets for plug X1 of X3 can also be used in the plugs X2, X4, X5 and X13.

Spare parts list Delegate Unit LBB 3450

Posnr.	Description	Code Number
	Grommet	5322 462 40211
	Jack for headphone	5322 268 10202
	Delegate cable	5322 321 21658
	Plug X13	5322 268 44142
	Spring for microphone stem	5322 492 63142
	Plug X2	5322 268 44152
	Microphone	5322 242 20094
	Cap for microphone	5322 462 40728
	Foam cap for microphone	5322 462 40731
	Cap.chip 100 PF 5% 50V for microphone	4822 122 31765
	Socket X13	5322 268 24041

Spare parts list PCB Delegate

Posnr.	Description		Code Number
	Knob push button S1		5322 414 10014
	Rubberplate S1		5322 466 91584
C 1	Cap.chip 10NF		4822 122 32442
C 2	Cap.ceramic 100NF10%X7R	50V	5322 122 32839
C 3	Cap.electrolyt 10UF 20%	25V	4822 124 21732
C 4	Cap.electrolyt 4,7UF 20%	25V	5322 124 21966
C 5	Cap.electrolyt 0,47UF 20%	25V	5822 124 21453
C 6	Cap.electrolyt 4,7UF 20%	25V	5322 124 21966
C 7	Cap.electrolyt 47UF 20%	10V	5322 124 21975
C 8	Cap.electrolyt 4,7UF 20%	25V	5322 124 21966
C 9	Cap.chip 3,3 NF 10%	50V	4822 122 31969
C 10	Cap.ceramic 100NF10%X7R	50V	5322 122 32839
C 11	Cap.chip 47PF 5%	50V	4822 122 31772
C 12	Cap.chip 100PF 5%	50V	4822 122 31765
C 13	Cap.chip 100PF 5%	50V	4822 122 31765
C 14	Cap.electrolyt 22UF 20%	25V	4822 124 21646
C 15	Cap.electrolyt 4,7UF 20%	25V	5322 124 21966
C 17	Cap.ceramic 100NF10%X7R	50V	5322 122 32839
C 18	Cap.ceramic 82NF 10%	50V	5322 122 32838
C 20	Cap.electrolyt 10UF 20%	25V	4822 124 21732
C 21	Cap.electrolyt 4,7UF 20%	25V	5322 124 21966
C 22	Cap.electrolyt 4,7UF 20%	25V	5322 124 21966
C 23	Cap.chip 100PF 5%	50V	4822 122 31765
C 24	Cap.electrolyt 100UF 50%	25V	4822 124 20701
C 25	Cap.chip 100PF 5%	50V	4822 122 31765

C 26	Cap.chip 4,7NF10%X7R	50V	4822 122 31784
C 27	Cap.ceramic 100NF10%X7R	50V	5322 122 32839
C 28	Cap.chip 10NF		4822 122 32442
C 29	Cap.chip 4,7NF10%X7R	50V	4822 122 31784
C 30	Cap.chip 100PF 5%	50V	4822 122 31765
C 31	Cap.chip 100PF 5%	50V	4822 122 31765
C 32	Cap.electrolyt 47UF 50%	25V	4822 124 20699
C 33	Cap.electrolyt 47UF 50%	40V	4822 124 20713
C 35	Cap.electrolyt 22UF 20%	25V	4822 124 21646
C 36	Cap.electrolyt 47UF 50%	25V	4822 124 20699
C 40	Cap.ceramic 100NF10%X7R	50V	5322 122 32839
C 44	Cap.ceramic 100NF10%X7R	50V	5322 122 32839
C 45	Cap.ceramic 100NF10%X7R	50V	5322 122 32839
C 47	Cap.chip 22NF 10%	63V	4822 122 31797
C 48	Cap.chip 470PF 5%	63V	4822 122 31727
D 1	Diode BAV70		5322 130 34331
D 2	Diode BAV70		5322 130 34331
D 3	Diode,reference BZX84-C5V1		5322 130 32835
D 4	Diode CQW54-V1		5322 130 32704
D 5	Diode BAV70		5322 130 34331
D 6	Diode BAV70		5322 130 34331
D 7	Diode BAV70		5322 130 34331
D 8	Diode BAV70		5322 130 34331
D 9	Diode BAV70		5322 130 34331
D 10	Diode TIUG164		5322 130 32587
D 11	Diode BZX84-C15		5322 130 33662
D 12	Diode BAV70		5322 130 34331
D 13	Diode BAV70		5322 130 34331
D 17	Diode BAV70		5322 130 34331
D 19	Diode,reference BZV46-2V0		4822 130 31248
D 20	Diode,reference BZX79-B30		4822 130 34328
IC 1	Integr.circuit LF353N		5322 209 81395
IC 2	Integr.circuit LM324D		5322 209 71598
IC 3	Integr.circuit LM393D		PHIN 5322 209 71599
IC 4	Integr.circuit LM393D		PHIN 5322 209 70225
IC 5	Integr.circuit HEF4013BT		5322 209 14477
R 1	Res.chip 10K 2% 0,125W		4822 111 90249
R 2	Res.chip 47K 2% 0,125W		4822 111 90543
R 3	Res.chip 390E 2% 0,125W		5322 111 90138
R 4	Res.chip 10K 2% 0,125W		4822 111 90249
R 5	Res.chip 47K 2% 0,125W		4822 111 90543
R 6	Res.chip 33K 2% 0,125W		5322 111 90267
R 7	Res.chip 1K 2% 0,125W		5322 111 90092
R 8	Res.chip 220K 2% 0,125W		4822 111 90178
R 9	Res.chip 220E 2% 0,125W		4822 111 90178

R 11	Res.chip 10K 2% 0,125W	4822 111 90249
R 12	Res.chip 100K 2% 0,125W	4822 111 90214
R 13	Res.chip 10K 2% 0,125W	4822 111 90249
R 14	Res.chip 560E 2% 0,125W	5322 111 90113
R 15	Res.chip 100K 2% 0,125W	4822 111 90214
R 16	Res.chip 1K5 2% 0,125W	4822 111 90151
R 17	Res.chip 12K 2% 0,125W	4822 111 90253
R 18	Res.chip 1M 5% 0,125W	5322 111 90253
R 19	Res.chip 100K 2% 0,125W	4822 111 90214
R 20	Res.chip 18K 2% 0,125W	4822 111 90238
R 21	Res.chip 100E 2% 0,125W	5322 111 90091
R 22	Res.chip 100K 2% 0,125W	4822 111 90214
R 23	Res.chip 22K 2% 0,125W	4822 111 90251
R 24	Res.chip 100K 2% 0,125W	4822 111 90214
R 25	Res.chip 470E 2% 0,125W	5322 111 90109
R 26	Res.chip 18K 2% 0,125W	4822 111 90238
R 27	Res.chip 39K 2% 0,125W	5322 111 90108
R 28	Res.chip 100K 2% 0,125W	4822 111 90214
R 29	Res.chip 27K 2% 0,125W	4822 111 90542
R 30	Res.chip 1K 2% 0,125W	5322 111 90092
R 31	Res.chip 18K 2% 0,125W	4822 111 90238
R 32	Res.chip 1M 5% 0,125W	5322 111 90094
R 33	Res.chip 1M 5% 0,125W	5322 111 90094
R 34	Res.chip 1K 2% 0,125W	5322 111 90092
R 35	Res.chip 220K 2% 0,125W	4822 111 90197
R 36	Res.chip 100K 2% 0,125W	4822 111 90214
R 37	Res.chip 1M 5% 0,125W	5322 111 90094
R 38	Res.chip 10M 5% 0,125W	5322 111 91141
R 39	Res.chip 100K 2% 0,125W	4822 111 90214
R 40	Res.chip 100K 2% 0,125W	4822 111 90214
R 41	Res.chip 100K 2% 0,125W	4822 111 90214
R 42	Res.chip 1K 2% 0,125W	5322 111 90092
R 43	Res.chip 100K 2% 0,125W	4822 111 90214
R 44	Res.chip 100K 2% 0,125W	5322 111 90094
R 45	Res.chip 27K 2% 0,125W	4822 111 90214
R 46	Res.chip 47K 2% 0,125W	4822 111 90543
R 47	Res.chip 1K 2% 0,125W	5322 111 90092
R 48	Res.chip 100K 2% 0,125W	4822 111 90214
R 49	Res.chip 100K 2% 0,125W	4822 111 90214
R 50	Res.chip 27K 2% 0,125W	4822 111 90542
R 51	Res.chip 68K 2% 0,125W	4822 111 90202
R 52	Res.chip 33K 2% 0,125W	5322 111 90267
R 53	Res.chip 100K 2% 0,125W	4822 111 90214
R 54	Res.p.t.c.	5322 116 44008
R 55	Res.chip 100K 2% 0,125W	4822 111 90214

R 56	Res.chip 15K 2% 0,125W	4822 111 90196
R 57	Res.chip 15K 2% 0,125W	4822 111 90196
R 58	Res.chip 12K 2% 0,125W	4822 111 90253
R 59	Res.chip 2K7 2% 0,125W	4822 111 90569
R 60	Res.chip 100K 2% 0,125W	4822 111 90214
R 72	Res.chip 10K 2% 0,125W	4822 111 90249
R 82	Res.chip 3K9 2% 0,125W	4822 111 90571
R 83	Res.chip 3K9 2% 0,125W	4822 111 90571
R 86	Res.chip 220K 2% 0,125W	4822 111 90197
R 92	Res.chip 82K 2% 0,125W	4822 111 90575
R 93	Res.chip 68K 2% 0,125W	4822 111 90202
R 94	Res.chip 680E 2% 0,125W	4822 111 90162
R 95	Res.chip 100K 2% 0,125W	4822 111 90214
R 96	Res.chip 100K 2% 0,125W	4822 111 90572
R 97	Res.chip 100K 2% 0,125W	4822 111 90214
R 98	Res.metal film 390E 5% 2,5W	5322 116 54401
R 99	Res.chip 10K 2% 0,125W	4822 111 90249
R 102	Res.chip 1M 5% 0,125W	5322 111 90094
R 103	Res.chip 1M 5% 0,125W	5322 111 90094
S 3	Pin	5322 535 84341
S 3	Link, jumber 76264 101 Berg	5322 290 60298
SK 1	Switchmechanism S1	5322 278 14006
TS 1	Transistor BC847C	PHIN 5322 130 42755
TS 2	Transistor BC857C	PHIN 5322 130 42756
TS 3	Transistor BC847C	PHIN 5322 130 42755
TS 4	Transistor BC847C	PHIN 5322 130 42755
TS 5	Transistor BC847C	PHIN 5322 130 52755
TS 6	Transistor BC817-40	4822 130 42615
TS 7	Transistor BC807-40	PHIN 5322 130 60123
TS 8	Transistor BC817-40	4822 130 41615
TS 9	Transistor BC817-40	4822 130 42615
X 5	Socket,male	5322 265 64078

Spare parts list unit cable assy

Description	Code Number
Connector Hirschmann MAS885	5322 265 40535
Plug X3	5322 267 74025
Socket X3	5322 268 24041
Bracket for X3	5322 462 44161

Recommended spare parts list of delegate unit LBB 3450

	Description	Code Number
	Grommet	5322 462 40211
	Jack for headphone	5322 268 10202
	Delegate cable	5322 321 21658
	Plug X13	5322 268 44142
	Spring for microphone stem	5322 492 53142
	Plug X2	5322 268 44152
	Microphone	5322 242 20094
	Cap for microphone	5322 462 40728
	Foam cap for microphone	5322 462 40731
	Cap chip 100 PF 5% 50V for microphone	4822 122 31765
	Socket X13	5322 268 24041

Spare parts list PCB Delegate

	Description	Code Number
	Knob push button S1	5322 414 10014
	Rubber plate S1	5322 466 91584
D 3	Diode, Reference BZX84-C5V1	5322 130 32835
D 4	Diode CQW54-V1	5322 130 32704
D 10	Diode TIUG164	5322 130 32587
D 11	Diode BZX84-C15	5322 130 33662
D 19	Diode, Reference BZV46-2V0	4822 130 31248
D 20	Diode, Reference BZX79-830	4822 130 34328
IC 1	Integr. circuit LF353N	5322 209 81395
IC 2	Integr. circuit LM324D	5322 209 71598
IC 3	Integr. circuit LM393D	PHIN 5322 209 70225
IC 4	Integr. circuit LM393D	PHIN 5322 209 70225
IC 5	Integr. circuit HEF4013BT	5322 209 14477
SK 2	Switchmechanism S1	5322 278 14006
TS 1	Transistor BC847C	PHIN 5322 130 42755
TS 2	Transistor BC857C	PHIN 5322 130 42756
TS 3	Transistor BC847C	PHIN 5322 130 42755
TS 4	Transistor BC847C	PHIN 5322 130 42755
TS 5	Transistor BC847C	PHIN 5322 130 52755
TS 6	Transistor B817-40	4822 130 42615
TS 7	Transistor BC807-40	PHIN 5322 130 60123
TS 8	Transistor BC817-40	4822 130 41615
TS 9	Transistor BC817-40	4822 130 42615
X 5	Socket, male	5322 265 64078

Spare parts list unit cable assy

Description	Code Number
Connector Hirschmann MAS885	5322 265 40535
Plug X3	5322 267 74025
Socket X3	5322 268 24041
Bracket for X3	5322 462 44161

Spare partlist for extension cable LBB 3305/00

Connector 8P Male	5322 265 40535
Connector 8P Female	5322 267 50656

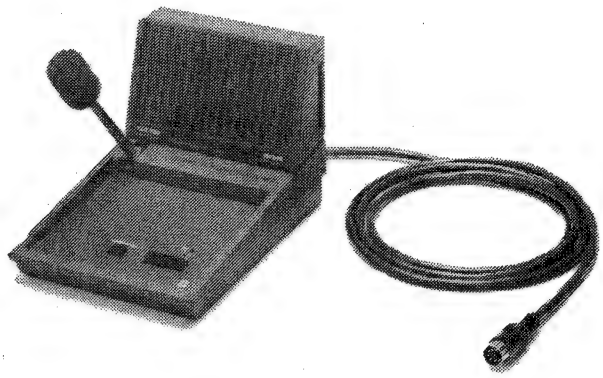
Recommended spare parts list for extension cable LBB 3305/00

Spare partlist for extension cable LBB 3305/00

Connector 8P Male	5322 265 40535
Connector 8P Female	5322 267 50656

LBB 3351/00 Table top chairmans unit with loudspeaker.

LBB 3451/00 Table top chairmans unit without loudspeaker.



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Figures

1. INTRODUCTION CHAIRMANS UNIT

The chairmans unit can be divided into 3 parts:
(see block diagram Fig. 1.)

Part 1 Microphone amplifier
Amplifies the microphone signal, and switches it to the audio line.

Part 2 Audio Amplifier
Amplifies the audio signal, and switches it to the loudspeaker, and headphone jack.

Part 3 Microphone / Loudspeaker Switching Circuit
Switches the microphone/loudspeaker "on" or "off", depending on the status of the control signals. Control signals are made up of the following:
(1) Microphone switch signal
(2) Remote call signal
(3) priority call signal

2. CIRCUIT DESCRIPTION CHAIRMANS UNIT

(see Circuit diagram Fig. 2 and 3).

Switching "on", as in the delegate unit, flip flop IC5a is reset for a short duration, thereafter the unit is ready for use.

Switching control circuit (general)

The Switching Control Circuit consists of IC5a, IC3a and IC6, and performs the switching functions in the chairmans unit. Switching is due to the state of the call microphone signal, priority signal, remote call signal, or the audio signal to the loudspeaker. IC5a, is a flip flop who's output is logic "0" i.e. 0v or logic "1" i.e. 15V depending on its input signal. When its output is 0v, the signal on the audioline is fed via an amplifier to the loudspeaker, and the microphone signal is switched "off" at the pre-amplifier to the audioline. When the output of IC5a is 15v (logic "1"), the microphone signal will be switched to the audio line via the pre-amplifier and the loudspeaker will be switched "off".

The microphone call signal, from the microphone button, or from the microphones remote control line via IC6, is fed to the clock input of IC5. The clock input onto IC5, causes the flip flop to produce an output of logic 1 (15v) therefore the microphone will be switched "on". and the loudspeaker "off". The priority signal from the priority call button is fed to TS10 and TS11, which ensures, that when the priority button is pressed, the microphone is switched "on" and or 1.5V DC level is switched via the priority line to the delegate unit (or the central control desk if used).

Listening

In the listening position, the switching control circuit switches via the loudspeaker switching circuit. The audio signal via the audio amplifier to the loudspeaker, and the microphone signal is then disconnected from the audio line. During listening, the clock input to IC5 is "0", because the call button has not been pressed, and no remote call via IC6 has been applied. Because there is no set pulse, on the set input, the output of the flip flop remains at 0v. This output is then connected to the base of TS5, which with associated components, forms the microphone switching circuit. Because there is no priority call signal, from the priority button, transistor TS10 is not conducting, therefore the base of TS5 remains at 0v. TS4, part of the pre-amplifier; also does not conduct, therefore the microphone signal on the base of TS4, will not reach the audio line, and acts as if it were switched "off".

The loudspeaker switching circuit, includes TS1 and relay K1, and associated components. The 0v on the output of the flip flop, is fed to the base of TS1, therefore the transistor is not conducting, no current flows through the relay, and the relay remains de-energised. In this position the relays contacts are closed, and the audio signal via the audio amplifier, is fed to the loudspeaker.

Audio Amplifier

The audio amplifier, identical to the one in the delegates unit, amplifies the audio signal, and feeds it to the loudspeaker.

Call Position

In the call position, the microphone switching circuit is activated by the switching control circuit. The microphone signal is fed via the pre-amplifier, and switched to the audio line. The loudspeaker is switched "off" from the audio amplifier, by the loudspeaker switching circuit. Whilst the call button is pressed in, the clock input of IC5a will be at logic "1". The data input is also logic "1", and because this input is connected to the output pin 2 of IC5a, on the positive edge of the clockpulse, the output of the flip flop is logic 1 (15v). The inverted output on pin 2, is connected to the data input, therefore the input now changes to logic "0". The 15v at IC5a output pin 1 is fed to the base of TS5. Because there is no priority, TS10 and TS11, will not influence the voltage on the base of TS5, therefore TS5 will conduct, allowing the microphone signal on the base of TS4, to be switched to the collector and fed to the audio line.
In a similar way as in the delegate unit, the loudspeaker is switched "off" via TS1 and relay K1. The pre-amplifier (IC1a and TS4) and the limiter (TS2 and TS3) are identical to those used in the delegate unit.
In the same way as in the delegate unit, if the call button S1 is pressed again, the call position will be reset, via IC5.

Loudspeaker unit (only in LBB 3351/00)

In the listening position OV is applied, via X1-5, to the base of TS1, therefore no current flow through the relay coil, and the relay is not activated. In this state the contacts are closed via X1-2. The audio signal is applied to the loudspeaker, X1-1 is connected to ground. Because no current flow through the relay coil, the pilot leds D1 until D4 inclusive are not illuminated. In the call position approximately 15V is applied, via X1-5, to the base of TS1, therefore current flow from +15V at X1-6 via the relay coil to ground (X1-4). In this "active state" the relay contacts are opened. The audio signal at X1-2 cannot reach the loudspeaker. The current through D1 until D4 inclusive cause these pilot leds to illuminate.

TS2 and associated circuitry provide for a fast switch over from listening position to call position. At the moment TS1 becomes deductive the current flowing via the pilot leds through the coil of relay K1 is high enough to open the contacts in a "normal" way. When TS1 is not conductive, C1 is charged. The voltage applied via R2 and R3 to the base of TS2 ensures that this transistor is conductive. But because of the non conductive state of TS1 no current can be flow via TS2 through K1 to ground.
At the moment the system switches over from listening position to call position, TS1 becomes conductive and current flows via the pilot leds through the relay coil and TS1 to ground. Extra current also flows via TS2 through the relay coil and TS1 to ground. This "extra" current, which only flows for a short moment, ensures that the magnetic field caused by the relay coil is "extra" strong and therefore opens the relay contacts "extra" fast.
This "extra" current may only flow for a short moment through the relay coil. At the moment TS1 becomes conductive. The charged capacitor C1 is connected to ground, C1 discharges via D12 and R1. The voltage over the capacitor decreases, therefore the voltage over R2 and R3, causing the base voltage of TS2 to increase. TS2 becomes less conductive.
The current through the relay coil decreases, but remains enough (current via pilot leds) to keep the contacts opened.

Priority

When the chairman requires priority over the delegate microphones, he presses button S2 continuously. The circuit description is as follows, TS11 will conduct, together with TS10. The voltage on the collector of TS10, rises to approximately 15v, this voltage is then applied to the base of TS5, which then conducts. The microphone signal is switched to the audio line and the loudspeaker will be switched "off". Due to TS11 conducting, the priority line is connected to ground, via R63, D18, and D14, the voltage on the priority line is now approximately 1.5v. The delegate unit microphones, will be switched "off".
If the chairman's priority button is released, TS10 and TS11 will not conduct, causing the line to the microphone switching circuit to be Ov. TS5 is not conducting, causing the microphone signal via TS4, not to be switched to the audio line. Because TS1 is not now conducting, the loudspeaker will be switched to the audio line.
The priority line becomes 27v, and the delegates, can now switch "on" and "off" their microphones as normal.

Disable Request

Because the chairman must always be able to switch "on" his microphone whenever he chooses, his switching control circuit cannot be reset by the disable request line. The disable request line is continued through to the next unit in the chain.

Remote Control

Only when a central control desk is connected to the system, the microphone callfunction can be remotely controlled. The chairman cannot request, for a remote control call by using a request line, but must somehow attract the attention of the control desk operator, either by hand or some other means. When the chairman has given the operator a sign to switch "on" his microphone, the remote line which is at 15v due to resistor R75, is decreased.
This decreased voltage via R70, is then applied to the negative input of IC6. Because the voltage at the positive input of IC6, via resistors R68 and R69 is greater than at the negative input, the output of the comparator will be 12v i.e. logic "1". Logic "1", is fed to the clock input of the flip flop IC5, via D15 and R42. The data input logic 1 is switched to the output, on the edge of the clock signal. Therefore the flip flop output reaches 15v, which is then fed to the base of TS9, causing it to conduct, the voltage on the remote line is then kept to a DC level of approximately 6V, due the action of the zener diode D16.

This 6v on the input of IC6, is higher than the voltage on the +input, therefore the output of the comparator is approximately 2v, and the clock input to flip flop is once again Ov.
Therefore, when the remote line is at Ov, a complete clockpulse is automatically generated, and fed to the clock pulse input of the flip flop.

When the operator of the central control desk, releases the remote call button, the voltage at the negative input of IC6, becomes greater than the voltage on the positive input, and because of R75, the clock input to the flip flop is at Ov.

3. SPARE PARTS LIST

Spare parts list Chairmans Unit LBB 3351

	Description	Code Number
	Grommet	5322 462 40211
	Jack for headphone	5322 268 10202
	Chairman cable	5322 321 21658
	Housing,connect plug X13	5322 268 44142
	Spring for microphone stem	5322 492 63142
	Plug X2	5322 268 44152
	Microphone	5322 242 20094
	Cap for microphone	5322 462 40728
	Foam cap for microphone	5322 462 40731
	Cap.chip 100PF 5% 50V for microphone	4822 122 31765
	Socket X13	5322 268 24041

Spare parts list of PCB chairman

	Description			Code Number
	Knob push button S1			5322 414 10014
	Rubber plate for S1			5322 466 91584
	Knob push button S2			5322 414 10013
C 1	Cap.chip	10NF		4822 122 32442
C 2	Cap.ceramic	100NF 10%X7R	50V	5322 122 32839
C 3	Cap.electrolyt	10UF 20%	25V	4822 124 21732
C 4	Cap.electrolyt	4,7UF 20%	25V	5322 124 21966
C 5	Cap.electrolyt	0,47UF 20%	25V	4822 124 21453
C 6	Cap.electrolyt	4,7UF 20%	25V	5322 124 21966
C 7	Cap.electrolyt	47UF 20%	10V	5322 124 21975
C 8	Cap.electrolyt	4,7UF 20%	25V	5322 124 21966
C 9	Cap.chip	3,3NF 10%	50V	4822 122 31969
C 10	Cap.ceramic	100NF 10%X7R	50V	5322 122 32839
C 11	Cap.chip	47PF 5%	50V	4822 122 31772
C 12	Cap.chip	100PF 5%	50V	4822 122 31765
C 13	Cap.chip	100PF 5%	50V	4822 122 31765
C 14	Cap.electrolyt	22UF 20%	25V	4822 124 21646
C 15	Cap.electrolyt	4,7UF 20%	25V	5322 124 21966
C 25	Cap.chip	100PF 5%	50V	4822 122 31765
C 28	Cap.chip	10NF		4822 122 32442
C 30	Cap.chip	100PF 5%	50V	4822 122 31765
C 31	Cap.chip	100PF 5%	50V	4822 122 31765
C 32	Cap.electrolyt	47UF 50%	25V	4822 124 20699
C 33	Cap.electrolyt	47UF 50%	40V	4822 124 20713
C 35	Cap.electrolyt	22UF 20%	25V	4822 124 21646
C 36	Cap.electrolyt	47UF 50%	25V	4822 124 20699

C 37	Cap.ceramic	100NF 10% X7R	50V		5322 122 32839
C 38	Cap.chip	10NF			4822 122 32442
C 39	Cap.ceramic	100NF 10% X7R	50V		5322 122 32839
C 40	Cap.ceramic	100NF 10% X7R	50V		5322 122 32839
C 44	Cap.ceramic	100NF 10% X7R	50V		5322 122 32839
C 46	Cap.ceramic	100NF 10% X7R	50V		5322 122 32839
C 47	Cap.ceramic	100NF 10% X7R	50V		5322 122 32839
C 48	Cap.chip	470PF 5%	63V		4822 122 31727
D 1	Diode	BAV70			5322 130 34331
D 2	Diode	BAV70			5322 130 34331
D 3	Diode,reference	BZX84-C5V1			5322 130 32835
D 4	Diode	CQW54-V1			5322 130 32704
D 5	Diode	BAV70			5322 130 34331
D 11	Diode	BZX84-C15			5322 130 33662
D 12	Diode	BAV70			5322 130 34331
D 14	Diode	BYW56			5322 130 34973
D 15	Diode	BAV70			5322 130 34331
D 16	Diode,reference	BZV49-C6V2		PHIN	5322 130 33672
D 18	Diode	BAV70			5322 130 34331
D 19	Diode,reference	BZV46-2V0			4822 130 31248
D 20	Diode,reference	BZX79-B30			4822 130 34328
IC 1	Integr.circuit	LF353N			5322 209 81395
IC 3	Integr.circuit	LM393D		PHIN	5322 209 71599
IC 5	Integr.circuit	HEF4013BT			5322 209 14477
IC 6	Integr.circuit	MC1741CD			5322 209 71597
R 1	Res.chip	10K 2% 0,125W			4822 111 90249
R 2	Res.chip	47K 2% 0,125W			4822 111 90543
R 3	Res.chip	390E 2% 0,125W			4822 111 90138
R 4	Res.chip	10K 2% 0,125W			4822 111 90249
R 5	Res.chip	47K 2% 0,125W			4822 111 90543
R 6	Res.chip	33K 2% 0,125W			5322 111 90267
R 7	Res.chip	1K 2% 0,125W			5322 111 90092
R 8	Res.chip	220K 2% 0,125W			4822 111 90197
R 9	Res.chip	220E 2% 0,125W			4822 111 90178
R 11	Res.chip	10K 2% 0,125W			4822 111 90249
R 12	Res.chip	100K 2% 0,125W			4822 111 90214
R 13	Res.chip	10K 2% 0,125W			4822 111 90249
R 14	Res.chip	560E 2% 0,125W			5322 111 90113
R 15	Res.chip	100K 2% 0,125W			4822 111 90214
R 16	Res.chip	1K5 2% 0,125W			4822 111 90151
R 17	Res.chip	12K 2% 0,125W			4822 111 90253
R 18	Res.chip	1M 5% 0,125W			5322 111 90094
R 19	Res.chip	100K 2% 0,125W			4822 111 90214
R 20	Res.chip	18K 2% 0,125W			4822 111 90238

R 21	Res.chip	100E	2%	0,125W	5322 111 90091
R 22	Res.chip	100K	2%	0,125W	4822 111 90214
R 23	Res.chip	22K	2%	0,125W	4822 111 90251
R 24	Res.chip	100K	2%	0,125W	4822 111 90214
R 25	Res.chip	470E	2%	0,125W	5322 111 90109
R 37	Res.chip	1M	5%	0,125W	5322 111 90094
R 42	Res.chip	1K	2%	0,125W	5322 111 90092
R 43	Res.chip	100K	2%	0,125W	4822 111 90214
R 44	Res.chip	1M	5%	0,125W	5322 111 90094
R 45	Res.chip	100K	2%	0,125W	4822 111 90214
R 46	Res.chip	47K	2%	0,125W	4822 111 90543
R 48	Res.chip	100K	2%	0,125W	4822 111 90214
R 49	Res.chip	100K	2%	0,125W	4822 111 90214
R 50	Res.chip	27K	2%	0,125W	4822 111 90542
R 51	Res.chip	68K	2%	0,125W	4822 111 90202
R 52	Res.chip	33K	2%	0,125W	5322 111 90267
R 53	Res.chip	100K	2%	0,125W	4822 111 90214
R 54	Res.P.T.C.				5322 116 44008
R 55	Res.chip	100K	2%	0,125W	4822 111 90214
R 56	Res.chip	15K	2%	0,125W	4822 111 90196
R 57	Res.chip	15K	2%	0,125W	4822 111 90196
R 58	Res.chip	12K	2%	0,125W	4822 111 90253
R 59	Res.chip	2K7	2%	0,125W	4822 111 90569
R 60	Res.chip	100K	2%	0,125W	4822 111 90214
R 61	Res.chip	100K	2%	0,125W	4822 111 90214
R 62	Res.chip	100K	2%	0,125W	4822 111 90214
R 63	Res.metal film	1K	5%	1,6 W	5322 116 54909
R 64	Res.P.T.C.				5322 116 44008
R 65	Res.chip	47K	2%	0,125W	4822 111 90543
R 66	Res.chip	10K	2%	0,125W	4822 111 90249
R 67	Res.chip	1M	5%	0,125W	5322 111 90094
R 68	Res.chip	100K	2%	0,125W	4822 111 90214
R 69	Res.chip	33K	2%	0,125W	5322 111 90267
R 70	Res.chip	100K	2%	0,125W	5322 111 90214
R 71	Res.P.T.C.				5322 116 44008
R 72	Res.chip	10K	2%	0,125W	4822 111 90249
R 75	Res.chip	100K	2%	0,125W	4822 111 90214
R 92	Res.chip	82K	2%	0,125W	4822 111 90575
R 93	Res.chip	68K	2%	0,125W	4822 111 90202
R 94	Res.chip	680E	2%	0,125W	4822 111 90162
R 97	Res.chip	100K	2%	0,125W	4822 111 90214
R 98	Res.metal film	390E	5%	2,5 W	5322 116 54401
R 102	Res.chip	1M	5%	0,125W	5322 111 90094
R 103	Res.chip	1M	5%	0,125W	5322 111 90094
SK 1	Switchmechanism S1 micr. button				5322 278 14006

SK 2	Switchmechanism	S2 prio. button		5322 278 14006
TS 1	Transistor	BC847C	PHIN	5322 130 42755
TS 2	Transistor	BC857C	PHIN	5322 130 42756
TS 3	Transistor	BC847C	PHIN	5322 130 42755
TS 4	Transistor	BC847C	PHIN	5322 130 42755
TS 5	Transistor	BC847C	PHIN	5322 130 42755
TS 6	Transistor	BC817-40		4822 130 42615
TS 7	Transistor	BC807-40	PHIN	5322 130 60123
TS 8	Transistor	BC817-40		4822 130 42615
TS 9	Transistor	BC817-40		4822 130 42615
TS 10	Transistor	BC857C	PHIN	5322 130 42756
TS 11	Transistor	BC817-40		4822 130 42615
X 5	Socket,male			5322 265 64078

Spare parts list of Unit Cable Assy

Description		Code Number
Connector	Hirschmann MAS88S	5322 265 40535
Plug X3		5322 267 74025
Socket X3		5322 268 24041
Bracket for X3		5322 462 44161

Spare parts list of Loudspeaker Enclosure CCS400

Description		Code Number
Loudspeaker	AD3371/Y150	4822 240 30172
Plastic lens on rear side		5322 381 10785
Plug X1		5322 268 44152
Bracket for X1		5322 462 44161

Spare parts list of Printed Board Assy LBB

	Description			Code Number
C 1	Cap.electrolyt	470NF 50% 63V		4822 124 20719
D 10	Diode	BAV70		5322 130 34331
D 11	Diode	BAV70		5322 130 34331
D 12	Diode	BAV70		5322 130 34331
K 1	Relay			5322 280 80524
R 1	Res.chip	22K 2% 0,125W		4822 111 90251
R 2	Res.chip	22K 2% 0,125W		4822 111 90251
R 3	Res.chip	10K 2% 0,125W		4822 111 90249
TS 1	Transistor	BC847C	PHIN	5322 130 42755
TS 2	Transistor	BC857C	PHIN	5322 130 42756

Recommended spare parts list chairmans unit LBB 3351

Description	Code Number
Grommet	5322 462 40211
Jack for headphone	5322 268 10202
Chairman cable	5322 321 21658
Housing,connect plug X13	5322 268 44142
Spring for microphone stem	5322 492 63142
Plug X2	5322 268 44152
Microphone	5322 242 20094
Cap for microphone	5322 462 40728
Foam cap for microphone	5322 462 40731
Cap.chip 100PF 5% 50V for microphone	4822 122 31765
Socket X13	5322 268 24041

Spare parts list of PCB chairman

	Description		Code Number
	Knob push button S1		5322 414 10014
	Rubber plate for S1		5322 466 91584
	Knob push button S2		5322 414 10013
D 3	Diode, reference	BZX84-C5V1	5322 130 32835
D 4	Diode	CQW54-V1	5322 130 32704
D 11	Diode	BZX84-C15	5322 130 33662
D 16	Diode, reference	BZV49-C6V2	PHIN 5322 130 33672
D 19	Diode, reference	BZV46-2V0	4822 130 31248
D 20	Diode, reference	BZX79-830	4822 130 34328
IC 1	Integr. circuit	LF353N	5322 209 81395
IC 3	Integr. circuit	LM393D	PHIN 5322 209 71599
IC 6	Integr. circuit	MC1741CD	5322 209 71597
SK 1	Switchmechanism S1 mic. button		5322 278 14006
SK 2	Switchmechanism S2 prio. button		5322 278 14006
TS 1	Transistor	BC847C	PHIN 5322 130 42755
TS 2	Transistor	BC857C	PHIN 5322 130 42756
TS 3	Transistor	BC847C	PHIN 5322 130 42755
TS 4	Transistor	BC847C	PHIN 5322 130 42755
TS 5	Transistor	BC847C	PHIN 5322 130 42755
TS 6	Transistor	BC817-40	4822 130 42615
TS 7	Transistor	BC807-40	PHIN 5322 130 60123
TS 8	Transistor	BC817-40	4822 130 42615
TS 9	Transistor	BC817-40	4822 130 42615

TS10	Transistor	BC857C	PHIN	5322 130 42756
TS11	Transistor	BC817-40		4822 130 42615
X 5	Socket, male			5322 265 64078

Spare parts list of Unit Cable Assy

Description		Code Number
Connector	Hirschmann MAS88S	5322 265 40535
Plug X3		5322 267 74025
Socket X3		5322 268 24041
Bracket for X3		5322 462 44161

Spare parts list of loudspeaker Enclosure CCS400

Description		Code Number
Loudspeaker	AD3371/Y150	4822 240 30172
Plastic lens on rear side		5322 381 10785
Plug X1		5322 268 44152
Bracket for X1		5322 462 44161

Spare parts list of Printed Board Assy LBB

	Description			Code Number
K 1	Relay			5322 280 80524
TS1	Transistor	BC847C	PHIN	5322 130 42755
TS2	Transistor	BC857C	PHIN	5322 130 42756

Plug X13 can be used also as plug for X5.
Plug X2 can be used also as plug for X4.
The socket X3 can also be used as socket X2, X1 or X4.
The brackets for plug X1 or X3 can also be used in the plugs X2, X4, X5 and X13.

Spare parts list chairmans unit LBB 3451

	Description	Code Number
	Grommet	5322 462 40211
	Jack for headphone	5322 268 10202
	Delegate cable	5322 321 21658
	Plug X13	5322 268 44142
	Spring for microphone stem	5322 492 63142
	Plug X2	5322 268 44152
	Microphone	5322 242 20094
	Cap for microphone	5322 462 40728
	Foam cap for microphone	5322 462 40731
	Cap. chip 100PF 5% 50V for microphone	4822 122 31765
	Socket X13	5322 268 24041

Spare parts list of PCB chairman

	Description	Code Number
	Knob push button S1	5322 414 10014
	Rubber plate S1	5322 466 91584
	Knob push button S2	5322 414 10013
C 1	Cap.chip 10NF	4822 122 32442
C 2	Cap.ceramic 100NF 10% X7R 50V	5322 122 32839
C 3	Cap.electrolyt 10UF 20% 25V	4822 124 21732
C 4	Cap.electrolyt 4,7UF 20% 25V	5322 124 21966
C 5	Cap.electrolyt 0,47UF 20% 25V	4822 124 21453
C 6	Cap.electrolyt 4,7UF 20% 25V	5322 124 21966
C 7	Cap.electrolyt 47UF 20% 10V	5322 124 21975
C 8	Cap.electrolyt 4,7UF 20% 25V	5322 124 21966
C 9	Cap.chip 3,3NF 10% 50V	4822 122 31969
C 10	Cap.ceramic 100NF 10% X7R 50V	5322 122 32839
C 11	Cap.chip 47PF 5% 50V	4822 122 31772
C 12	Cap.chip 100PF 5% 50V	4822 122 31765
C 13	Cap.chip 100PF 5% 50V	4822 122 31765
C 14	Cap.electrolyt 22UF 20% 25V	4822 124 21646
C 15	Cap.electrolyt 4,7UF 20% 25V	5322 124 21966
C 25	Cap.chip 100PF 5% 50V	4822 122 31765
C 28	Cap.chip 10NF	4822 122 32442
C 30	Cap.chip 100PF 5% 50V	4822 122 31765
C 31	Cap.chip 100PF 5% 50V	4822 122 31765
C 32	Cap.electrolyt 47UF 50% 25V	4822 124 20699
C 33	Cap.electrolyt 47UF 50% 40V	4822 124 20713
C 35	Cap.electrolyt 22UF 20% 25V	4822 124 21646

C 36	Cap.electrolyt	47UF 50%	25V		4822 124 20699
C 37	Cap.ceramic	100NF10%X7R	50V		5322 122 32839
C 38	Cap.chip	10NF			4822 122 32442
C 39	Cap.ceramic	100NF10%X7R	50V		5322 122 32839
C 40	Cap.ceramic	100NF10%X7R	50V		5322 122 32839
C 44	Cap.ceramic	100NF10%X7R	50V		5322 122 32839
C 46	Cap.ceramic	100NF10%X7R	50V		5322 122 32839
C 47	Cap.ceramic	100NF10%X7R	50V		5322 122 32839
C 48	Cap.chip	470PF 5%	63V		4822 122 31727
D 1	Diode	BAV70			5322 130 34331
D 2	Diode	BAV70			5322 130 34331
D 3	Diode,reference	BZX84-C5V1			5322 130 32835
D 4	Diode	CQW54-V1			5322 130 32704
D 5	Diode	BAV70			5322 130 34331
D 11	Diode	BZX84-C15			5322 130 33662
D 12	Diode	BAV70			5322 130 34331
D 14	Diode	BYW56			5322 130 34973
D 15	Diode	BAV70			5322 130 34331
D 16	Diode,reference	BZV49-C6V2		PHIN	5322 130 33672
D 18	Diode	BAV70			5322 130 34331
D 19	Diode,reference	BZV46-2V0			4822 130 31248
D 20	Diode,reference	BZX79-B30			4822 130 34328
IC 1	Integr.circuit	LF353N			5322 209 81395
IC 3	Integr.circuit	LM393D		PHIN	5322 209 71599
IC 5	Integr.circuit	HEF4013BT			5322 209 14477
IC 6	Integr.circuit	MC1741CD			5322 209 11311
R 1	Res.chip	10K 2% 0,125W			4822 111 90249
R 2	Res.chip	47K 2% 0,125W			4822 111 90543
R 3	Res.chip	390E 2% 0,125W			4822 111 90138
R 4	Res.chip	10K 2% 0,125W			4822 111 90249
R 5	Res.chip	47K 2% 0,125W			4822 111 90543
R 6	Res.chip	33K 2% 0,125W			5322 111 90267
R 7	Res.chip	1K 2% 0,125W			5322 111 90092
R 8	Res.chip	220K 2% 0,125W			4822 111 90197
R 9	Res.chip	220E 2% 0,125W			4822 111 90178
R 11	Res.chip	10K 2% 0,125W			4822 111 90249
R 12	Res.chip	100K 2% 0,125W			4822 111 90214
R 13	Res.chip	10K 2% 0,125W			4822 111 90249
R 14	Res.chip	560E 2% 0,125W			5322 111 90113
R 15	Res.chip	100K 2% 0,125W			4822 111 90214
R 16	Res.chip	1K5 2% 0,125W			4822 111 90151
R 17	Res.chip	12K 2% 0,125W			4822 111 90253
R 18	Res.chip	1M 5% 0,125W			5322 111 90094
R 19	Res.chip	100K 2% 0,125W			4822 111 90214
R 20	Res.chip	18K 2% 0,125W			4822 111 90238
SK 1	Switch mechanism S1 mic. button				5322 278 14006

SK 2	Switchmechanism	S2 prio. button		5322 278 14006
TS 1	Transistor	BC847C	PHIN	5322 130 42755
TS 2	Transistor	BC857C	PHIN	5322 130 42756
TS 3	Transistor	BC847C	PHIN	5322 130 42755
TS 4	Transistor	BC847C	PHIN	5322 130 42755
TS 5	Transistor	BC847C	PHIN	5322 130 42755
TS 6	Transistor	BC817-40		4822 130 42615
TS 7	Transistor	BC807-40	PHIN	5322 130 60123
TS 8	Transistor	BC817-40		4822 130 42615
TS 9	Transistor	BC817-40		4822 130 42615
TS 10	Transistor	BC857C	PHIN	5322 130 42756
TS 11	Transistor	BC817-40		4822 130 42615
X 5	Socket,male			5322 265 64078

Spare parts list of Unit Cable Assy

Description		Code Number
Connector	Hirschmann MAS88S	5322 265 40535
Plug X3		5322 267 74025
Socket X3		5322 268 24041
Bracket for X3		5322 462 44161

Recommended spare parts list Chairmans unit LBB 3451

Description	Code Number
Grommet	5322 462 40211
Jack for headphone	5322 268 10202
Delegate cable	5322 321 21658
Plug X13	5322 268 44142
Spring for microphone stem	5322 492 63142
Plug X2	5322 268 44152
Microphone	5322 242 20094
Cap for microphone	5322 462 40728
Foam cap for microphone	5322 462 40731
Cap. chip 100PF 5% 50V for microphone	4822 122 31765
Socket X13	5322 268 24041

Spare parts list of PCB chairman

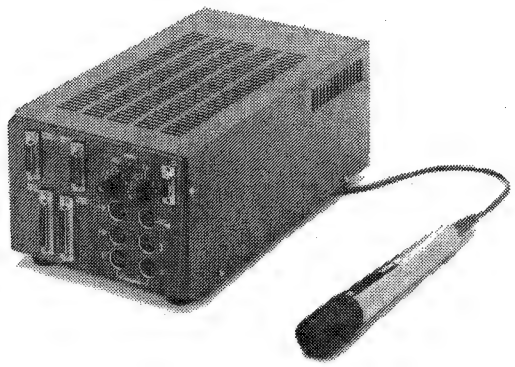
	Description			Code Number
	Knob push button S1			5322 414 10014
	Rubber plate S1			5322 466 91584
	Knob push button S2			5322 414 10013
D 3	Diode, reference	BZX84-C5V1		5322 130 32835
D 4	Diode	CQW54-V1		5322 130 32704
D 11	Diode	BZX84-C15		5322 130 33662
D 16	Diode, reference	BZV49-C6V2	PHIN	5322 130 33672
D 19	Diode, reference	BZV46-2V0		4822 130 31248
D 20	Diode, reference	BZX79-830		4822 130 34328
IC 1	Integr. circuit	LF353N		5322 209 81395
IC 3	Integr. circuit	LM393D	PHIN	5322 209 71599
IC 5	Integr. circuit	HEF4013BT		5322 209 14477
IC 6	Integr. circuit	MC1741CD		5322 209 11311
SK 1	Switch mechanism S1 mic. button			5322 278 14006
SK 2	Switch mechanism S2 prio. button			5322 278 14006
TS 1	Transistor	BC847C	PHIN	5322 130 42755
TS 2	Transistor	BC857C	PHIN	5322 130 42756
TS 3	Transistor	BC847C	PHIN	5322 130 42755
TS 4	Transistor	BC847C	PHIN	5322 130 42755
TS 5	Transistor	BC847C	PHIN	5322 130 42755
TS 6	Transistor	BC817-40		4822 130 42615
TS 7	Transistor	BC804-40	PHIN	5322 130 60123
TS 8	Transistor	BC817-40		4822 130 42615
TS 9	Transistor	BC817-40		4822 130 42615

TS10	Transistor	BC857C	PHIN	5322 130 42756
TS11	Transistor	BC817-40		4822 130 42615
X 5	Socket, male			5322 265 64078

Spare parts list of Unit Cable Assy

Description		Code Number
Connector	Hirschmann MAS88S	5322 265 40535
Plug X3		5322 267 74025
Socket X3		5322 268 24041
Bracket for X3		5322 462 44161

LBB 3300/00 Central Supply Unit (C.S.U.)



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Figures:

1. INTRODUCTION CENTRAL SUPPLY UNIT

The basic assembly of the Central Supply Unit consists of two P.C.B.'s, a connector panel and a "Basic P.C.B.".

The connector panel; connects the various control and audio lines from the basic P.C.B., to the peripheral equipment and vice versa. The loud-speaker level adjustment circuit, and the limiting switch S102, for limiting the maximum number of switched on microphones, is also mounted on this panel.
(See block diagram Fig. 1)

The basic P.C.B. can be sub-divided into 4 parts.
(See block diagram Fig. 2)

Part 1. Power Supply Unit

Provides the power for the C.S.U., and all associated peripheral equipment.

Part 2. Mixing Amplifier

Amplifies the priority "oscillator" signal, "line-in" signal, "tape-in" signal and the "conference" signal from the telephone coupler.

Part 3. Output Amplifier

Consists of three main functions:
(A) Amplifies the audio signal for the telephone coupler
(B) Provides the line-out signal
(C) Provides the floor, tape recorder, and disable request audio signal

Part 4. Audio Control Circuit

Consists of a stabilizer, which stabilizes the D.C. level on the audio line, a comparator circuit which controls the -3 dB circuit on the connector panel, and a comparator which controls the disable request line.

2. CIRCUIT DESCRIPTION CENTRAL SUPPLY UNIT

(See circuit diagram Fig. 3)

Switching on S1, on the Central Supply Unit, powers up the whole system. The mains voltage is transformed by transformer T3, rectified by the bridge rectifier D1, C45 and C48, and fed to the tripple power supply.
The triple power supply is split into three sections:
Section a. TS1, TS2, TS3, TS16
Section b. TS4, TS5, TS6
Section c. TS7, TS8, TS9

If the temperature in the Power Suppy Unit overheats, thermal switch TH1 opens, the voltage on the base of TS15 decreases, causing the transistor to conduct. The Power Supply voltage on the emitter of TS15 is now applied to the base of TS2, TS5 and TS8, causing them to be non-conductive, thereby switching the Power Supply to the system "off", until the temperature is low enough to close TH1.

The three Power Supply parts are identical, except that in section a, transistors TS1 and TS16 are connected in parallel to provide more output current.
The output voltage of the mains supply, causes a voltage across R3 and D7. In section a, this voltage provides a stabilized base voltage for transistor TS3 of about 22 Volts.
Because the voltage on the base of TS3 is 22 Volts, the transistor conducts, and collector current flows through R2, D2, D3, adjusting the base voltage for TS2, causing it to conduct together with TS1 and TS16.

If the current output of the Power Supply increases, i.e. due to an overload, the output voltage decreases, if this output voltage, falls below 21.5 Volts, D4 will conduct causing a voltage drop at R4.
TS3 then becomes less conductive, the collector current decreases causing TS2 to become less conductive. Because the emitter current of TS2 is lower, TS1 and TS16 become less conductive, therefore the output current will be stabilized.

Sections b and c operating characteristics are identical to section a.

Section a. Provides power to the interpreters´ desks, the interpreters´ monitor panel, and the monitor distribution board. The Power Supply, sections b and c are identical except that they provide less current than section a.

Section b. Provides power for the microphone plug in unit, telephone coupler, and the second delegate chain connected to BU104.

Section c. Provides power for the delegate chain 1 connected to BU101 and the telephone coupler.

The Power Supply voltage of 27V, is divided and stabilized at 15 Volts, 13.5 Volts, and 3.5 Volts, via the voltage stabilizer IC1, and associated circuitry.

Audio Line Stabilizer

The audio line stabilizer consists of a IC7a, TS11, TS12, TS13 and associated components. The function of the circuit is to stabilize a DC voltage onto the audio line. When the DC voltage on the audio line increases or decreases, and applied to the base of TS13, the transistor conducts in unison. The current flowing via R39, TS12, R31 and R40 to ground is increasing or decreasing, therefore the voltage on the + input of IC7a operational amp, will also increase or decrease depending on the d.c. voltage change on the audio line. When the d.c. voltage on the audio line decreases, the output voltage of IC7a increases, and fed via TS11, the audio line is stabilized, or vice versa. When the d.c. voltage on the audio line increases, the output of IC7a decreases, and the audio line is stabilized.

Attenuator

The attenuator consists of IC5, IC6, (b.c.d.) and associated circuitry. The action of the circuit is to attenuate the audio signal 3 dB, when two or more microphones are switched on simultaneously. When a microphone is switched on in one of the delegate units, a current flowing from the power supply, is fed via R34 and TS11 to the delegate unit. When only one microphone is switched "on" the current is so that the voltage drop at R34 is very small. This means that the voltage at the emitter of TS11 is approximately 15 Volts, and applied to the negative input of IC5. The voltage at the positive input is about 14.5 Volts, because of the voltage divider R28 and R29, the output of the comparator is now 0 Volts, therefore the switch IC6 will not be activated. When 2 or more microphones are switched "on" the current via R34 and TS11 to the audio line increases, causing the voltage drop at R34 to be larger than 0.5 Volts, therefore the voltage at the negative input of IC5 will be less than 14.5 Volts. Because the positive input is at 14.5 Volts, the comparator output is now at 15 Volts. This logic "1" enables IC6 and closes the switches. One of the resistors R106 to R110, is connected in parallel to the already selected resistor by the volume adjustment switch S101. This parallel resistor causes a 3 dB attenuation of the audio signal. When only one switched "on" microphone is left, the voltage on the negative input of IC5 is larger than the positive input, therefore the switches of IC6 are opened.

Limiter (disable request circuit)

The limiter circuit consists of IC6a, IC2a and associated components. Its function is to limit the number of delegate microphones; which can be switched "on" simultaneously. The maximum number of switched "on" microphones can be adjusted with switch S102 to either 1, 3 or 6.
The voltage drop at R34 is dependant on the number o switched "on" delegate microphones. The voltage via R22 at the input of IC2a decreases when more microphones are switched "on", because the voltage at R34 increases. The voltage corresponding to the selected number of simultaneous switched "on" microphones is applied to the positive input of IC2a. The corresponding voltage for the number of selected microphones is as follows:

6 microphones = 14 Volts
3 microphones = 14.4 Volts
1 microphones = 14.8 Volts
When the number of simultaneously switched "on" microphones is lower than the selected number, as selected by S102, the voltage on the negative input of IC2a is larger than the voltage on the positive input. The output of the comparator will now be 0 Volts. This output via R50 is connected to the disable request line, which is not active now. When the number of simultaneously switched "on" microphones reaches the selected maximum number, the voltage at R34 increases, and therefore the voltage on the negative input of IC2a is lower than the voltage on the positive input. The comparator output is now at 15 Volts. This 15 Volts on the disable request line causes a disable request in all of the delegate units, which means that no microphones can be switched "on". When one or more microphones are switched "off", the voltage at the negative input, increases to a value higher than at the + input. The comparator output will now be 0 Volts, and the disable request is no longer applied to the delegate units. The limiter can be switched "off" via a remote control line which is connected to BU101 pin 6. The voltage on the remote control line is connected to input 12 of IC6a and must be switched to approximately 15 Volts. This logic "1" enables the switch, to switch a voltage of 15 Volts at input 10 to the output 11, which is connected to the negative input of IC2a. This 15 Volts is always larger than the voltage on the positive input, independant of the maximum number of microphones selected by switch S102. The comparator output will be 0 Volts, therefore the disable request is in-active and cannot be made active because the comparator output stays at 0 Volts.

Oscillator

The oscillator consists of IC2b, TS10 and TS17, its function is to generate the "attention" signal, when the chairman requires priority over the delegates. When the chairman presses his priority button, the priority line becomes approximately 1.5 Volts, and as a result all switched "on" delegate microphones, switch "off" and their loudspeakers switch "on". The 1.5 Volts via line C in the Central Supply Unit is also applied to the oscillator circuit. Transistor TS10 is conducting and a current flows from the +27 Volts Power Supply (at the emitter) via R23 and also via TS17, C11, R27 and R24 to ground. TS17 becomes conductive and starts the oscillator via the positive input. The oscillator circuit consists of IC2b, R19, C10 and generates a square wave signal of approximately 700 Hz. When TS10 conducts, C11 charges via R27/R24. The charge current ensures that a decreasing voltage across R24 arises. This voltage is shortcircuited to ground in a rythm of 700 Hz by the oscillator and via a low pass filter R70/C12, C13 applied to the pre-amplifier part. A 700 Hz attention signal which decreases slowly to zero, is now heard in the delegate loudspeakers. When the priority button is released, the base of T10 goes to 27 Volts and the transistor becomes non-conductive. C11 discharge via D27, R23 and D24. (discharge time is about 6 times shorter than the charge time) The oscillator circuit is in-active.

Pre-amplifier

The pre-amplifier consists of IC4a and TS14. The mixing amplifier amplifies the "attention" signal, "line-in" signal, and signals from the telephone coupler and tape recorder. The output signal of the operational amplifier IC4a is fed via the emitter of TS14, and fed back to the negative input via R66 and C30.
The "attention" signal, and the signal from the tape recorder are directly applied to the negative input of the pre-amplifier, the "attention" signal is fed via R70 and C12. The "line-in" signal is applied via a separation transformer T1 and resistor R53. Before the "line-in" signal is amplified, its level can be adjusted by connecting a jumper S3 in one of the two positions, a-b, or a-c. In the a-c position, resistor R52 is connected to ground, and together with the resistance of the secondary winding of T1, forms a voltage divider which ensures that only part of the "line-in" signal is applied to the negative input of IC4a. The telephone coupler signal is fed via R41, R42 and R54, to the negative input of the operation amplifier IC4a. Connecting the jumper S2 in one of the following positions, a-c, a-b, or b-d, the resistance can be adjusted, respectively to 0 Ohm, R42 or R42+R41. Adjusting the resistance, the level of the telephone coupler signal at the input of IC4a is adjusted (-16 dB,-4 dB respectively +6 dB).
The output of IC4a; via D25, is connected to the base of TS14, which applies the amplified signal to the audio line.
The signals on the audio line are amplified by three amplifiers A, B and C. Amplifier B, consists of IC3a. The signal on the audio line is fed to the + input of the operational amplifier, the output signal is fed via a separation transformer T2 to the "line-out" socket BU102. The RC network of R62/C28, R63/C24 in the feed back path and R61/C16 ensures that the low and high frequencies superimposed on the signal are filtered out.
Amplifier C consists of IC3b, which provides the audio signal for the int/mon panel via connector X103. The signal is applied via the voltage divider R64/R65 to the disable request line and fed via R48/R47 and R74 to the tape recorder output BU106-1/4. Connecting jumper S5 in the a-c or a-b position the output impedance to the recorder can be adjusted.
Amplifier A consists of IC4b and IC7b. The audio signal is applied to the negative input of IC4b. The output of the operational amplifier is connected to the negative input of IC7b. By connecting jumper S6, which adjusts the total resistance in the feed back path, the amplification of the operational amplifier IC7b and the level of the output signal can be adjusted. (a-c = -16 dB, a-d = -4 dB and b-c = +6 dB)
The output signal of IC7b is applied to the telephone coupler. When a telephone line is connected to the system, the fork circuit in the telephone coupler ensures that the signal from the telephone to the Central Supply Unit, and the conference signal to the telephone are dealt with separately. In general terms this means that the telephone signal; which is sent to the C.S.U., amplified and returned to the telephone line, can be suppressed or even reduced to zero in the telephone coupler. When a telephone coupler is used without a fork circuit, the signal to and from the telephone cannot be separated from eachother in the coupler. To avoid the telephone signal being fed back which is amplified by part A, the signal is compensated to zero at the junction between IC4b and IC7b.

This is achieved by placing a jumper S4 in position a-b. The signal from the telephone is applied to the output of IC4b. Because the amplified telephone signal is on the output of IC4b and in antiphase, the result will be zero on the input of IC7b. The telephone signal is not fed back to the telephone coupler. The conference signal (audio from the SCU) is normally amplified by IC7b and applied to the telephone coupler.

3. SPARE PARTS LIST

Spare parts list Interface Supply Unit

	Cap. Knob	5322 414 30075
	Dial knob	5322 414 70002
	Fuse holder	5322 256 34077
	Fuse 2.5A SLOW	4822 253 30026

Spare parts list PCB contribution

BU 101	Din connector 8P			5322 267 50659
BU 102	Din connector 5P			4822 267 40182
BU 103	Din connector 5P			4822 267 40182
BU 104	Din connector 8P			5322 267 50659
BU 105	Din connector 7P			4822 264 50101
BU 106	Din connector 5 p			5322 267 40182
C 101	100UF	50%	10V	4822 124 20679
D 101	CQY94BL-4			5322 130 32182
R 101	2K2	2%	0,125W	4822 111 90248
R 102	33K	2%	0,125W	5322 111 90267
R 103	33K	2%	0,125W	5322 111 90267
R 104	1M0	20%	LOG 0,05W	5322 101 20924
R 105	2K2	2%	0,125W	4822 111 90248
R 106	1K5	2%	0,125W	4822 111 90151
R 107	820E	2%	0,125W	4822 111 90171
R 108	470E	2%	0,125W	5322 111 90109
R 109	270E	2%	0,125W	4822 111 90154
R 110	120E	2%	0,125W	4822 111 90339
R 111	1K8	2%	0,125W	5322 111 90101
R 112	820E	2%	0,125W	4822 111 90171
R 113	390E	2%	0,125W	5322 111 90138
R 114	220E	2%	0,125W	4822 111 90178
R 115	120E	2%	0,125W	4822 111 90339
R 116	2K2	2%	0,125W	4822 111 90248
R 117	22K	2%	0,125W	4822 111 90251
R 118	10K	2%	0,125W	4822 111 90249
R 119	100E	2%	0,125W	5322 111 90091
R 120	47K	2%	0,125W	4822 111 90543
S 101	rotary switch			5322 273 80317
S 102	rotary switch			5322 273 80317

Spare parts list P.C.B. Basic

	Isolating bush between PCB and cooling plate			4822 255 40174
	Jumper S2, 5, 4, 3 or 6			5322 290 60298
C 1	3300UF 30%		63V	5322 124 40805
C 2	470UF 20%		40V	5322 124 21729
C 3	470UF 20%		40V	5322 124 21729
C 4	470UF 20%		40V	5322 124 21729
C 5	100NF 10%	X7R	50V	5322 122 32839
C 6	47UF 50%		25V	4822 124 20699
C 7	10UF 20%		25V	4822 124 21747
C 8	100PF 5%		50V	4822 122 31765
C 9	22UF 50%		25V	4822 124 20698
C 10	10NF			4822 122 32442
C 11	4,7UF 50%		63V	4822 124 20726
C 12	10NF			4822 122 32442
C 13	4,7NF 10%	X7R	50V	4822 122 31784
C 14	10NF			4822 122 32442
C 15	10UF 50%		40V	4822 124 20708
C 16	33NF 10%		63V	5322 122 31848
C 17	33NF 10%		63V	5322 122 31848
C 18	100PF 5%		50V	4822 122 31765
C 19	3,9NF		50V	4822 122 32566
C 20	22UF 50%		25V	4822 124 20698
C 21	22UF 50%		25V	4822 124 20698
C 22	22UF 50%		25V	4822 124 20698
C 23	100PF 5%		50V	4822 122 31765
C 25	100PF 5%		50V	4822 122 31765
C 26	100UF 50%		25V	4822 124 20701
C 27	220PF 5%		63V	4822 122 31965
C 28	220PF 5%		63V	4822 122 31965
C 29	1UF 50%		63V	4822 124 20722
C 30	100PF 5%		50V	4822 122 31765
C 31	22UF 20%		25V	4822 124 21646
C 32	22UF 20%		25V	4822 124 21646
C 33	560PF 5%		50V	4822 122 31773
C 34	100PF 5%		50V	4822 122 31765
C 35	10UF 20%		25V	4822 124 21747
C 36	10UF 20%		25V	4822 124 21747
C 37	47NF 10%		50V	4822 122 32542
C 38	22UF 50%		25V	4822 124 20698
C 39	22UF 50%		25V	4822 124 20698
C 40	47NF 10%		50V	4822 122 32542
C 41	47NF 10%		50V	4822 122 32542
C 42	47NF 10%		50V	4822 122 32542
C 43	10NF			4822 122 32442

C 44	1500NF 10%	100V	4822 121 42031
C 45	4,7NF 10% X7R	50V	4822 122 31784
C 46	4,7NF 10% X7R	50V	4822 122 31784
C 47	4,7NF 10% X7r	50V	4822 122 31784
C 48	4,7NF 10% X7R	50V	4822 122 31784
C 49	220NF 10%	63V	4822 121 41673
C 50	1000PF 5%	50V	4822 122 31746
C 51	470NF 10%	63V	4822 121 41674
C 52	100PF 5%	50V	4822 122 31765
C 53	22UF 20%	25V	4822 124 21646
C 54	47NF 10%	50V	4822 122 32542
D 1	BY224-600		5322 130 34761
D 2	BAV70		5322 130 34331
D 3	BAV70		5322 130 34331
D 4	BAV70		5322 130 34331
D 5	BAV70		5322 130 34331
D 6	BZX84-C5V1		5322 130 32835
D 7	BZX84-C22		5322 130 33725
D 8	BAV70		5322 130 34331
D 9	BAV70		5322 130 34331
D 10	BAV70		5322 130 34331
D 11	BAV70		5322 130 34331
D 12	BZX84-C5V1		5322 130 32835
D 13	BZX84-C22		5322 130 33725
D 14	BAV70		5322 130 34331
D 15	BAV70		5322 130 34331
D 16	BAV70		5322 130 34331
D 17	BAV70		5322 130 34331
D 18	BZX84-C5V1		5322 130 32835
D 19	BZX84-C22		5322 130 33725
D 20	BYW56		5322 130 34973
D 22	BAV70		5322 130 34331
D 23	BYW56		5322 130 34973
D 24	BAV70		5322 130 34331
D 25	BZX84-C5V1		5322 130 32835
D 26	BZX84-C5V1		5322 130 32835
D 27	BAV70		5322 130 34331
IC 1	MC7815CT		4822 209 80808
IC 2	MC1458N		4822 209 81349
IC 3	LF353N		5322 209 81395
IC 4	LF353N		5322 209 81395
IC 5	TDB0156DP		5322 209 82804
IC 6	HEF4066BT		5322 209 14542
IC 7	LF353N		5322 309 81395

R 1	3E9	5%	1,6 W	4822 116 51865
R 2	2K2	1%	0,6 W	4822 116 53025
R 3	8K2	2%	0,125W	5322 111 90118
R 4	470E	2%	0,125W	5322 111 90109
R 5	22K	1%	0,6 W	5322 116 53286
R 6	3E6	5%	2,0 W	4822 116 53281
R 7	2K2	1%	0,6 W	4822 116 53025
R 8	8K2	2%	0,125W	5322 111 90118
R 9	470E	2%	0,125W	5322 111 90109
R 10	22K	1%	0,6 W	5322 116 53286
R 11	3E6	5%	2,0 W	4822 116 53281
R 12	2K2	1%	0,6 W	4822 116 53025
R 13	8K2	2%	0,125W	5322 111 90118
R 14	470E	2%	0,125W	5322 111 90109
R 15	22K	1%	0,6 W	5322 116 53286
R 16	3E9	5%	1,6 W	4822 116 51865
R 17	100K	2%	0,125W	4822 111 90214
R 18	100K	2%	0,125W	4822 111 90214
R 19	100K	2%	0,125W	4822 111 90214
R 20	22K	2%	0,125W	4822 111 90251
R 21	10K	2%	0,125W	4822 111 90249
R 22	10K	2%	0,125W	4822 111 90249
R 23	10K	2%	0,125W	4822 111 90249
R 24	47K	2%	0,125W	4822 111 90543
R 25	47K	2%	0,125W	4822 111 90543
R 26	150K	2%	0,125W	5322 111 90099
R 27	47K	2%	0,125W	4822 111 90543
R 28	150K	2%	0,125W	5322 111 90099
R 29	5K6	2%	0,125W	4822 111 90572
R 30	3K3	2%	0,125W	4822 111 90157
R 31	10K	2%	0,125W	4822 111 90249
R 32	100K	2%	0,125W	4822 111 90214
R 33	47K	2%	0,125W	4822 111 90543
R 34	43R	1%	0,6 W	5322 116 53597
R 36	15K	2%	0,125W	4822 111 90196
R 37	100K	2%	0,125W	4822 111 90214
R 38	33K	2%	0,125W	5322 111 90267
R 39	10K	2%	0,125W	4822 111 90249
R 40	22K	2%	0,125W	4822 111 90251
R 41	47K	2%	0,125W	4822 111 90543
R 42	18K	2%	0,125W	4822 111 90238
R 43	910E	1%	0,6 W	4822 116 52868
R 44	330E	2%	0,125W	5322 111 90106
R 45	10K	2%	0,125W	4822 111 90249

R 46	10K 2% 0,125W	4822 111 90249
R 47	680E 2% 0,125W	4822 111 90162
R 48	10K 2% 0,125W	4822 111 90249
R 49	62R 1% 0,6 W	5322 116 53598
R 50	10K 2% 0,125W	4822 111 90249
R 51	100K 2% 0,125W	4822 111 90214
R 52	82E 2% 0,125W	4822 111 90124
R 53	3K9 2% 0,125W	4822 111 90571
R 54	15K 2% 0,125W	4822 111 90196
R 55	10K 2% 0,125W	4822 111 90249
R 56	33K 2% 0,125W	5322 111 90267
R 57	3K3 2% 0,125W	4822 111 90157
R 58	220K 2% 0,125W	4822 111 90197
R 59	33K 2% 0,125W	5322 111 90267
R 60	1K 2% 0,125W	5322 111 90092
R 61	100K 2% 0,125W	4822 111 90214
R 62	33K 2% 0,125W	5322 111 90267
R 63	3K9 2% 0,125W	4822 111 90571
R 64	1K5 2% 0,125W	4822 111 90151
R 65	68E 2% 0,125W	4822 111 90203
R 66	33K 2% 0,125W	5322 111 90267
R 67	100K 2% 0,125W	4822 111 90214
R 68	680E 2% 0,125W	4822 111 90162
R 69	82K 2% 0,125W	4822 111 90575
R 70	220K 2% 0,125W	4822 111 90197
R 71	100E 2% 0,125W	5322 111 90091
R 72	33K 2% 0,125W	5322 111 90267
R 73	36K 1% 0,6 W	5322 116 53596
R 74	220K 2% 0,125W	4822 111 90197
R 75	100K 2% 0,125W	4822 111 90214
R 76	100K 2% 0,125W	4822 111 90214
R 77	100K 2% 0,125W	4822 111 90214
R 78	1M 5% 0,125W	5322 111 90094
R 79	1M 5% 0,125W	5322 111 90094
R 80	4K7 2% 0,125W	5322 111 90111
R 81	47K 2% 0,125W	4822 111 90543
R 82	10K 2% 0,125W	4822 111 90249
R 83	10K 2% 0,125W	4822 111 90249
S 2	Pins for jumper S2	5322 535 84341
S 3	Pins for jumper S3	5322 535 84341
S 4	Pins for jumper S4	5322 535 84341
S 5	Pins for jumper S5	5322 535 84341
S 6	Pins for jumper S6	5322 535 84341
T 1	Line in transformer	5322 140 10267
T 2	Line out transformer	5322 140 60264

TS 1	BDT96	5322 130 42209
TS 2	BC557C	4822 130 42231
TS 3	BC846B	PHIN 5322 130 60159
TS 4	BDT96	5322 130 42209
TS 5	BC557C	4822 130 42231
TS 6	BC846B	PHIN 5322 130 60159
TS 7	BDT96	5322 130 42209
TS 8	BC557C	4822 130 42231
TS 9	BC846B	PHIN 5322 130 60159
TS 10	BC857C	PHIN 5322 130 42756
TS 12	BC847C	PHIN 5322 130 42755
TS 13	BC847C	PHIN 5322 130 42755
TS 14	BC847C	PHIN 5322 130 42755
TS 15	BC857C	PHIN 5322 130 42756
TS 16	BDT96	5322 130 42209
TS 17	BC857C	PHIN 5322 130 42756

Recommended spare parts list Interface Supply Unit

	Cap. knob	5322 414 30075
	Dial knob	5322 414 70002
	Fuse holder	5322 256 34077

Spare parts list PCB contribution

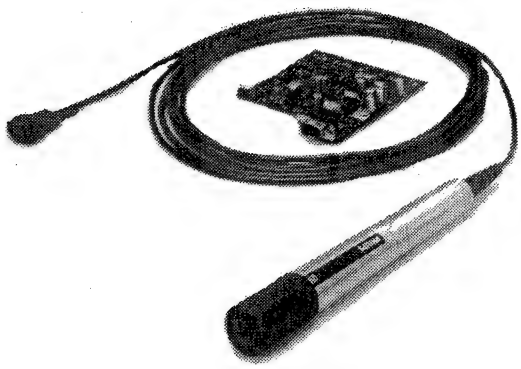
BU 101	Din connector 8P	5322 267 50659
BU 102	Din connector 5P	4822 267 40182
BU 103	Din connector 5P	4822 267 40182
BU 104	Din connector 8P	5322 267 50659
BU 105	Din connector 7P	4822 264 50101
BU 106	Din connector 5P	4822 267 40182
D 101	CQY94BL-4	5322 130 32182
S 101	Rotary switch	5322 273 80317
S 102	Rotary switch	5322 273 80317

Spare parts list P.C.B. Basic

	Isolating bush between PCB and cooling plate		4822 255 40174
C 1	3300UF 30%	63V	5322 124 40805
C 2	470UF 20%	40V	5322 124 21729
C 3	470UF 20%	40V	5322 124 21729
C 4	470UF 20%	40V	5322 124 21729
D 1	BY224-600		5322 130 34761
D 6	BZX84-C5V1		5322 130 32835
D 7	BZX84-C22		5322 130 33725
D 12	BZX84-C5V1		5322 130 32835
D 13	BZX84-C22		5322 130 33725
D 18	BZX84-C5V1		5322 130 32835
D 19	BZX84-C22		5322 130 33725
D 25	BZX84-C5V1		5322 130 32835
D 26	BZX84-C5V1		5322 130 32835
IC 1	MC7815CT		4822 209 80808
IC 2	MC1458N		4822 209 81349
IC 3	LF353N		5322 209 81395
IC 4	LF353N		5322 209 81395
IC 5	TDB0156DP		5322 209 82804
IC 6	HEF40668T		5322 209 14542
IC 7	LF353N		5322 309 81395

T	1	Line in transformer	5322 140 10267
T	2	Line out transformer	5322 140 60264
TS	1	BDT96	5322 130 42209
TS	2	BC557C	4822 130 42231
TS	3	BC846B	PHIN 5322 130 60159
TS	4	BDT96	5322 130 42209
TS	5	BC557C	4822 130 42231
TS	6	BC846B	PHIN 5322 130 60159
TS	7	BDT96	5322 130 42209
TS	8	BC557C	4822 130 42231
TS	9	BC846B	PHIN 5322 130 60159
TS	10	BC857C	PHIN 5322 130 42756
TS	12	BC847C	PHIN 5322 130 42755
TS	13	BC847C	PHIN 5322 130 42755
TS	14	BC847C	PHIN 5322 130 42755
TS	15	BC857C	PHIN 5322 130 42756
TS	16	BDT96	5322 130 42209
TS	17	BC857C	PHIN 5322 130 42756

LBB 3202/00 Microphone plug in unit



CONTENTS

Figures

1. INTRODUCTION MICROPHONE PLUG IN UNIT

The microphone plug in unit can be divided into 3 parts (see block diagram fig. 1).

Part 1. Microphone Amplifier
Amplifies the microphone input signal, and switches it to the audio line.

Part 2. Auto switch off circuit
Compares the audio signal and the microphone signal.
Automatically switches "off" the microphone, when there is no input from the delegate for approximately 30 to 45 seconds.

Part 3. Microphone Switching Circuit
Switches the microphone on/off, depending on the status of the control signals. The control signals comprise of the Microphone, remote, priority and disable request signals, plus the output signal from the Auto switch off circuit.

2. CIRCUIT DESCRIPTION MICROPHONE PLUG IN UNIT

(see Circuit diagram Fig. 2)

When the system is switched "on", capacitor C33 charges to the supply voltage 27v. Resistors R48, and R50 cause the voltage on the +input 5 of IC3b to the lower, than on the negative input 6. This state is valid until the power supply voltage reaches 14v.
The difference negative voltage, between the negative input and the positive input of IC3, causes the comparator output to be 0v. The 0v is applied to the negative input 2 of IC3a, because the voltage on the positive input 3 is +6v, the comparator output will be high i.e. logic "1". Logic "1" resets the flip flop IC5a. Switching on the system, the supply voltage exceeds 14v, the zener diode D11 will conduct, causing the voltage at input 6, to be left at a constant level of 15v. If the power supply voltage exceeds 20v, the voltage at the input of IC3b pin 5, is higher than the 15v on the input 6 causing a positive difference voltage, ensuring that the comparator no longer clamps the voltage to zero. 15v is applied to the negative input of IC3a, pin 2, which is higher than the +6v on the positive input 3, therefore the output from the comparator is 0v, is logic "0". Logic "0" will not reset the flip flop IC5, and the plug in unit is now "ready" for use.

Switching Control Circuit General

The switching control circuit IC5a, IC3a and IC4a/b carries out all the switching functions in the microphone plug in unit. Switching is due to the state of the call microphone signal, priority-, disable request and the microphone signal. IC5a is a flip flop, who's output is logic "0" (0v) or logic "1" (15v) depending on its input signals. When the output is 0v, the microphone signal is switched "off" from the pre-amplifier to the audio line. When the output is 15v, the microphone signal via the pre-amplifier will be switched to the audio line.

The priority and disable request line are via a comparator circuit, connected to the reset and data input. The priority signal, when active, ensures that the flip flop will be reset, and the active disable request signal ensures that the data input becomes "0". The microphone call signal, from the microphone button, is via inverter circuit around IC7, applied to the clock input of IC5, and the microphone remote call signal to the set input. The clock or set pulse can make the flip flop output logic "1" (15v), causing the microphone to be switched "on".

The audio comparator output, is connected via a comparator to the reset input of IC5. Therefore after the delay time of approximately 30 to 45 seconds, the flip flop will be reset, and the switched "on" microphone is then switched "off".

Call Position

In the call position, the microphone switching circuit is activated, by the switching control circuit. The microphone signal is fed via the pre-amplifier and switched to the audio line.

During a call, the logic "0" from the pressed microphone call button is via IC7 and associated circuitry inverted and applied as a "1" (15v) to the clock input of IC5.
No priority or remote signals are present,
therefore the reset input and the set input are at logic "0".
Because disable request is inactive, the data input of IC5 stays 15v, (logic "1"). The data input is high, and the output of the flip flop will be logic "1", (15v) on the positive edge of the clockpulse, caused by pressing the "call button". The inverse flip flop output is now "0", this output is fed back to the data input, which also becomes "0". This means that the next clockpulse (S1) will reset the flip flop. The 15v on output 1 is applied to the base of TS5 in the microphone switching circuit.
The transistor is conducting, causing TS4 also to conduct, current can now flow, via the emmitter of TS4 to ground. The microphone signal is taken from the collector. Because IC8a and IC8b are closed now, the microphone led illuminates.

Pre-Amplifier

The pre-amplifier consists of IC1a, TS4 and associated components.
A DC voltage is fed via TS1 and applied to the electret microphone line. The current flowing from TS1 to the electret microphone, ensures that the "FET" inside the microphone is conducting. The analogue microphone signal, is applied to the microphone line, by the microphone itself, and fed via C1 and C2 to the + and - input of the operational amp. IC1a. C1 ensures that the DC voltage for the electret microphone, cannot reach the input of the Op amp.
A DC voltage of approximately 4v is fed via R5, and R6 and R8 to the analogue microphone signal on the inputs of IC1a. C2 ensures that this DC voltage is not influenced by TS2 and TS3. The output signal of the Op amp. IC1a if fed back via R11/C48 to the -input. With potentiometer R10 the amplification of IC1a can be adjusted according to the sensitivity of the used microphone.
In this way differences in sensitivity of the microphones are compensated.
The amplified signal, a DC level of approximately 10v on which the audio signal is superimposed, from the Op amp is applied to the base of TS4.

Limiter

The limiter consists of TS2, TS3,and associated components. When the output signal of the Op amp IC1a reaches a value greater than ± 0.7v, D1 and D2 conduct, and so will TS2 or TS3. When either of these two transistors is conducting, the input signal from the pre-amplifier decreases. A sample of the current from the analogue microphone signal is then flowing via the conducting transistors to ground. The microphone signal is now limited.

The limiter is divided into two sections, the right section D2 and TS3 is for the positive AC part of the output signal, and the left section D1 and TS2, for the negative AC output signal.

Resetting "Call" Position

If the call button S1 is pressed again, IC5 receives another positive pulse on its clock input. The inverse output pin 2, was "0", and so the data input of IC5. After the clockpluse, the output pin 1, becomes "0", because the data input is "0". Output 2 is the inverse of output 1, is logic "1", therefore the data input is "1" again. The logic "0" at output 1 causes the microphone switching circuit to become in-active. Transistor TS5 is not conducting, due to the 0v on its base, from the output of IC5. Therefore the microphone signal on the base of TS4, is not switched to the audio line.

Priority

When the chairman wants priority over the delegate microphones the priority line becomes about 1,5V. Due R37 and R99 1V is applied to the -input of IC3a then.
Because the 6V on the +input the comperator output is about 15V which is logic "1". Via the reset input IC5 is now reset. The set input stays "0" and the data input "1". The flip flop output was "1", due to the reset the output becomes "0". The microphone signal is switched off by TS5 which is now nonconductive because of the 0V on its base.
As long as the priority line is 1,5V the reset input stays "1" and the flip flop resetted, pushing the call button does not influence the switching control circuit. The delegate can not switch on his microphone with his call button.

When the chairman resets his priority, the priority line becomes 27v, 27v is then fed to the -input of the comparator IC3a. Because the +input is 6v, the output is 0v, is logic "0", therefore the reset input to IC5 is no longer reset. Therefore the microphone can be switched on/of as normal via the call button.

Disable Request

When the adjusted number of microphones, are switched "on" (1, 3 or 6 via switch S102) simultaneously. The disable request line reaches approximately 27v. This 27v is applied to the -input of IC2d.
Because the +input is connected to 10v the output of the comparator becomes 0v. The data input which is at 15v, is then brought down to approximately 1v, due to the forward voltage on the diode D13. This 1v is logic "0" to the flip flop. When the microphone is swiched "on", during the disable request, the data input is already at "0", because the inverse flip flop output is at 0v. During the disable request, the switched "on" microphones can be switched "off" by pressing the call button. The positive pulse on the clock input, clocks the data which is at "0", to the output.

During the disable request, a microphone cannot be switched "on", because the data input is set to "0". The call pulses from the call button, only switches a "0" to the flip flop output.

When the number of switched "on" microphones, is less than the maximum number, adjusted by switch S102, the disable request line becomes 0v.
The output from the comparator IC2d is now not longer clamping the date input to zero. The plug in unit is now in the listening position, and the delegate is now able to switch "on" his microphone, by pressing his call button.

Audio Level Comparator

The audio level comparator ensures that when a delegate does not speak into his microphone for approximately 30 to 45 seconds, the flip flop IC5, fed via comparator IC3a, will be reset.

At input 3 of IC2a, a DC level of approximately 9v is applied. The microphone signal is applied to the -input 2 of IC2a. The Op. amp IC2a, subtracts the microphone signal from the DC level, and amplifies the resulting signal. The output signal is now at a 9v DC level, which is used to superimpose the amplified microphones signal on. This signal is then applied to the -input of IC2b and at input 5, the disable request signal. The disable request signal, plus a DC level from R20 on the disable request signal, together form a 9v DC level on which the audio signal (other delegates + delegate itself) is superimposed. IC2b subtracts the output of IC2a, which is the 9v on which the microphone signal is superimposed, from the 9v on which the microphone signal is superimposed. The output 7, of IC2b is at a DC level of 9v, on which the difference between the audio- and the microphone signal is superimposed. The difference voltage, can reduce the voltage on x, and the output of IC2a, which is the 9v on which the microphone signal is superimposed, can reduce the voltage on Y. When only the delegate is using his microphone, the audio signal is the same as the microphone signal. The Ac difference voltage at the output of IC2b is 0v, only the 9v DC level is on the output. The voltage on x is now 9v plus the forward voltage of D6, adding up to a total of approximately 10v.
When more than one delegate is speaking, the audio signal is higher than the microphone signal. On the output of IC2b, the difference voltage, superimposed on the 9v DC is applied, the negative going voltage of the AC difference signal, ensures that the 10v on x is decreased via D6 and C21.

If the delegate is silent, there is no microphone signal, therefore the AC voltage on the 9v DC level at the output of IC2a is at 0v. The voltage at Y is at 9v plus the forward voltage of D7, which in total sums up to approximately 10v. When the microphone is in use, the microphone signal is amplified by IC2a. The negative going voltage of this microphone signal ensures that the 10v on Y is decreased, via D7 and C22.

X is applied to the +input of IC2c, and Y to the -input. When X is greater than Y, the output of the Op amp is approximately 15v, and when Y is greater than X the output is 0v. Therefore when the delegate uses his microphone (he has to speak louder when others are using their microphone), the output of IC2a is 15v, C24 is now charged to 15v, because D9 is conducting. When the delegate stops using his microphone the output becomes 0v. Instantly C24 discharges via R35, and the DC level slowly decreases. This decreasing voltage is then fed via R36, and applied to the -input of IC3a. When the voltage becomes lower than approximately 7v, the comparator output, which was at 0v, now becomes 15v, and resets the flip flop IC5a, and the microphone will now be switched "off".

The time taken for C24 to discharge from 15v to approximately 7v is about 30 to 45 seconds. When the microphone is switched "off" the output of IC2c becomes 15v, independant of the number of other switched on microphones. This is because Y is approximately 1v, when the microphone is not switched "on". The 0v on the output of IC5a, is applied to D8, therefore C22 can only discharge until the voltage on Y reaches the forward voltage of D8, which is approximately 1v. This forward voltage cannot be exceeded, as long as 0v is applied to the cathode of D8. When the microphone is switched "on", by the delegate pressing his call button, then approximately 13v is applied to the cathode of diode D8. C22 can now partly discharge, and the voltage on Y increases to approximately 10v, because of the 9v DC on the cathode of D7 and its forward voltage of approximately 1v.

By placing the jumper S3, in the b-a position, capacitor C24 cannot discharge via R35, therefore the audio level comparator is in-active.
Switching S102, the audio level comparator can be made in-active. In the three position 1, 2 or 6 microphones in non-auto, the switch supplies 0v to the ground reference which is normally 9v DC.
This 0v is fed via R30 and C20, to the -input of IC2b and overrules the output signal from IC2a. The output of IC2b is now 0v, therefore X is at 10v. IC2c output, is and remains 15v, therefore the capacitor which is charged, discharges and the audio level comparator is in-active.

3. SPARE PARTS LIST

Spare parts list of Microphone plug in Unit LBB 3302/00

	Description	Code number
C 1	10 NF	4822 122 32442
C 2	100 NF 10% X 7 R 50 V	5322 122 32839
C 3	10 UF 20% 25 V	4822 124 21747
C 4	4,7 UF 20% 25 V	5322 124 21966
C 5	0,47 UF 20% 25 V	4822 124 21453
C 6	4,7 UF 20% 25 V	5322 124 21966
C 7	47 UF 20% 10 V	5322 124 21975
C 8	4,7 UF 20% 25 V	5322 124 21966
C 12	100 PF 5% 50 V	4822 122 31765
C 17	100 NF 10% X 7 R 50 V	5322 122 32839
C 18	82 NF 10% 50 V	5322 122 32838
C 20	10 UF 20% 25 V	4822 124 21732
C 21	4,7 UF 20% 25 V	5322 124 21966
C 22	4,7 UF 20% 25 V	5322 124 21966
C 23	100 PF 5% 50 V	4822 122 31765
C 24	100 UF 50% 25 V	4822 124 20701
C 25	100 PF 5% 50 V	4822 122 31765
C 26	4,7 NF 10% X 7 R 50 V	4822 122 31784
C 27	100 NF 10% X 7 R 50 V	5322 122 32839
C 28	10 NF	4822 122 32442
C 29	4,7 NF 10% X 7 R 50 V	4822 122 31784
C 30	100 PF 5% 50 V	4822 122 31765
C 31	100 PF 5% 50 V	4822 122 31765
C 32	47 UF 50% 25 V	4822 124 20699
C 33	47 UF 50% 40 V	4822 124 20713
C 35	22 UF 20% 25 V	4822 124 21646
C 36	47 UF 50% 25 V	4822 124 20699
C 41	56 NF 10%	4822 122 32183
C 43	22 UF 20% 25 V	4822 124 21646
C 45	100 NF 10% X 7 R 50 V	5322 122 32839
C 47	22 NF 10% 63 V	4822 122 31797
C 48	47 PF 5% 50 V	4822 122 31772
D 1	BAV 70	5322 130 34331
D 2	BAV 70	5322 130 34331
D 3	BZX 84-C5V1	5322 130 32835
D 6	BAV 70	5322 130 34331
D 7	BAV 70	5322 130 34331
D 8	BAV 70	5322 130 34331
D 9	BAV 70	5322 130 34331

D 11	BZX 84-C15				5322 130 33662
D 12	BAV 70				5322 130 34331
D 13	BAV 70				5322 130 34331
D 15	BAV 70				5322 130 34331
D 17	BAV 70				5322 130 34331
D 19	BZV 46- 2 V0				4822 130 31248
D 20	BZX 79- B30				4822 130 34328
D 21	BZX 79- B6V2				4822 130 34167
IC 1	LF 353 N				5322 209 81395
IC 2	LM 324 D				5322 209 83125
IC 3	LM 393 D		PHIN		5322 209 71599
IC 4	LM 393 D		PHIN		5322 209 71599
IC 5	HEF 4013 BT				5322 209 14477
IC 7	MC 1741 CD				5322 209 71597
IC 8	HEF 4066 BT				5322 209 14542
R 1	5 K 6	2%	0,125	W	4822 111 90572
R 2	47 K	2%	0,125	W	4822 111 90543
R 3	390 E	2%	0,125	W	5322 111 90138
R 4	10 K	2%	0,125	W	4822 111 90249
R 5	47 K	2%	0,125	W	4822 111 90543
R 6	33 K	2%	0,125	W	5322 111 90267
R 7	1 K	2%	0,125	W	5322 111 90092
R 8	220 K	2%	0,125	W	4822 111 90197
R 9	1 K 2	2%	0,125	W	5311 111 90096
R 10	4 K 7	10% LIN	0,5	W	5322 101 10691
R 11	68 K	2%	0,125	W	4822 111 90202
R 12	100 K	2%	0,125	W	4822 111 90214
R 13	10 K	2%	0,125	W	4822 111 90249
R 15	100 K	2%	0,125	W	4822 111 90214
R 16	1 K 5	2%	0,125	W	4822 111 90151
R 17	12 K	2%	0,125	W	4822 111 90253
R 18	1 M	5%	0,125	W	5322 111 90094
R 21	100 E	2%	0,125	W	5322 111 90091
R 22	JUMPER OE				4822 111 90163
R 26	18 K	2%	0,125	W	4922 111 90238
R 27	39 K	2%	0,125	W	5322 111 90108
R 28	100 K	2%	0,125	W	4822 111 90214
R 29	33 K	2%	0,125	W	5322 111 90267
R 30	1 K	2%	0,125	W	5322 111 90092
R 31	18 K	2%	0,125	W	4822 111 90238
R 32	1 M	5%	0,125	W	5322 111 90094
R 33	1 M	5%	0,125	W	5322 111 90094
R 34	1 K	2%	0,125	W	5322 111 90092
R 35	4 K 7	2%	0,125	W	5322 111 90111
R 36	100 K	2%	0,125	W	4822 111 90214

R 37	1 M	5%	0,125 W	5322 111 90094
R 38	10 M	5%	0,125 W	5322 111 91141
R 39	100 K	2%	0,125 W	4822 111 90214
R 40	100 K	2%	0,125 W	4822 111 90214
R 41	100 K	2%	0,125 W	4822 111 90214
R 42	1 K	2%	0,125 W	5322 111 90092
R 43	100 K	2%	0,125 W	4822 111 90214
R 44	1 M	5%	0,125 W	5322 111 90094
R 45	100 K	2%	0,125 W	4822 111 90214
R 46	47 K	2%	0,125 W	4822 111 90543
R 47	1 K	2%	0,125 W	5322 111 90092
R 48	100 K	2%	0,125 W	4822 111 90214
R 49	100 K	2%	0,125 W	4822 111 90214
R 50	27 K	2%	0,125 W	4822 111 90542
R 51	68 K	2 %	0,125 W	4822 111 90202
R 52	33 K	2%	0,125 W	5322 111 90267
R 53	100 K	2%	0,125 W	4822 111 90214
R 54				5322 116 44008
R 55	100 K	2%	0,125 W	4822 111 90214
R 56	15 K	2%	0,125 W	4822 111 90196
R 57	15 K	2%	0,125 W	4822 111 90196
R 58	12 K	2%	0,125 W	4822 111 90253
R 59	2 K 7	2%	0,125 W	4822 111 90569
R 60	100 K	2%	0,125 W	4822 111 90214
R 73	33 K	2%	0,125 W	5322 111 90267
R 74	100 K	2%	0,125 W	4822 111 90214
R 76	100 E	2%	0,125 W	5322 111 90091
R 77	100 E	2%	0,125 W	5322 111 90091
R 78	3 K 9	2%	0,125 W	4822 111 90571
R 79	100 K	2%	0,125 W	4822 111 90214
R 81	220 K	2%	0,125 W	4822 111 90197
R 82	3 K 9	2%	0,125 W	4822 111 90571
R 83	3 K 9	2%	0,125 W	4822 111 90571
R 84	JUMPER OE			4822 111 90163
R 85	JUMPER OE			4822 111 90163
R 86	220 K	2%	0,125 W	4822 111 90197
R 88	1 M	2%	0,125 W	5322 111 90094
R 92	82 K	2%	0,125 W	4822 111 90575
R 93	68 K	2%	0,125 W	4822 111 90202
R 94	680 E	2%	0,125 W	4822 111 90162
R 95	100 K	2%	0,125 W	4822 111 90214
R 96	5 K 6	2%	0,125 W	4822 111 90572
R 97	JUMPER OE			4822 111 90163
R 99	10 K	2%	0,125 W	4822 111 90249
R102	1 M	5%	0,125 W	5322 111 90094

R103	1 M	5%	0,125 W	5322 111 90094
R104	15 K	1%	0,6 W	4822 116 53083
S 3	Pins for S3			5322 535 84341
S 3	Jumper S3			5322 290 60298
TS 1	BC 847 C		PHIN	5322 130 42755
TS 2	BC 857 C		PHIN	5322 130 42756
TS 3	BC 847 C		PHIN	5322 130 42755
TS 4	BC 847 C		PHIN	5322 130 42755
TS 5	BC 847 C		PHIN	5322 130 42755
TS 8	BC 817-40			4822 130 42615
TS 9	BC 817-40			4822 130 42615
X 7	Microphone connector			5322 265 40345

Spare parts list for microphone assembly

	Microphone			5322 242 20094
	Cap for microphone			5322 462 50331
	Foam cap for microphone			5322 462 40731
	Mic. cable			5322 321 21078
	Knob for microphone push button			5322 414 30086
C 4	100 PF	5%	50 V for microphone	4822 122 31765
	Mic. switch mechanism			5322 276 11415
C 1	1,5 UF	20%	35 V	5322 124 14078
C 2	10 UF	50%	40 V	4822 124 20708
C 3	10 UF	50%	40 V	4822 124 20708
D 1	CQW 54			4822 130 32069
D 2	TIUG 164			5322 130 32587

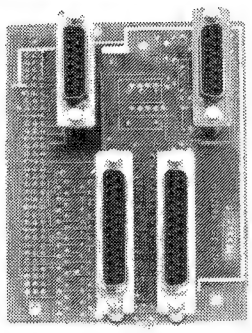
Recommended spare parts list Microphone plug in Unit LBB 3302/00

	Description		Code Number
D 3	BZX 84-C5V1		5322 130 32835
D 11	BZX 84-C15		5322 130 33662
D 19	BZV 46-x VO		4822 130 31248
D 20	BZX 79-B3O		4822 130 34328
D 21	BZX 79-B6V2		4822 130 34167
IC 1	LF 353 N		5322 209 81395
IC 2	LM 324 D		5322 209 83125
IC 3	LM 393 D	PHIN	5322 209 70225
IC 4	LM 393 D	PHIN	5322 209 70225
IC 5	HEF 4013 BT		5322 209 14477
IC 7	MC 1741 CD		5322 209 11311
IC 8	HEF 4066 BT		5322 209 14542
TS 1	BC 847 C	PHIN	5322 130 42755
TS 2	BC 857 C	PHIN	5322 130 42756
TS 3	BC 847 C	PHIN	5322 130 42755
TS 4	BC 847 C	PHIN	5322 130 42755
TS 5	BC 847 C	PHIN	5322 130 42755
TS 8	BC 817-40		4822 130 42615
TS 9	BC 817-40		4822 130 42615
X 7	Microphone connector		5322 265 40345

Spare parts list for Microphone Assembly

	Description	Code Number
	Microphone	5322 242 20094
	Cap for microphone	5322 462 50331
	Foam cap for microphone	5322 462 40731
	Mic. cable	5322 321 21078
	Knob for microphone push button	5322 414 30086
C 4	100 PF 5% 50 V for for microphone	4822 122 31765
	Mic. switch mechanism	5322 276 11415
D 1	CQW 54	4822 130 32069
D 2	TIUG 164	5322 130 32587

LBB 3301/00 Interpreters + monitor
Distribution panel



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Figures

1. INTRODUCTION
(see block diagram fig. 1)

The int. + mon. panel is a connection panel for the 6ch interpreters equipment on the one side and to the Monitor Distribution Board on the other hand. It connects the interpreters busbar and the floor signal to the M.D.B.
Channel 1 to 6 inclusive and floor from the M.D.B. are via this panel connected to the program selector output (distribution), and the audio from M.D.B. to the remote socket for monitoring via a loudspeaker. A "channel occupied" circuit provides information at the remote socket and at the transmitter socket. These 6 outputs can be used as an indication which channels are occupied.

2. CIRCUIT DESCRIPTION INT. + MON. PANEL

(see circuit diagram fig. 2)

On the panel, the feed from the power supply part a is applied to pin 4 and 5 on connector X203. This supply lines are distributed to the interpreters connector BU 207, to the M.D.B. connector X201 and finally via D201 and R205 to the monitor socket BU 210.

The power supply voltage is via the buffer circuit, which consists of TS201, R201, R202 and R203, applied to the resistor networks R223/R206/R207, etc. These networks provide for a DC level of approximately 18v on the floor, comm., ch1/ch6 and auto floor lines on the interpreters busbar.

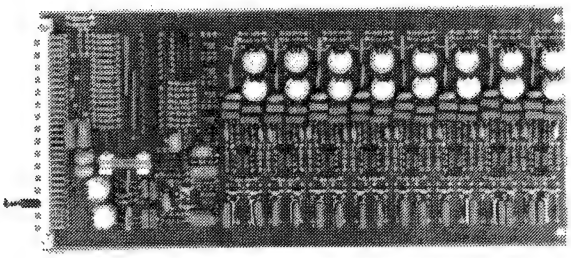
The asymetric audio line, coming from the connector panel, is applied to X203 pin 1 and 2 and via the seperation transformer T201 to the floor line on the panel.

The lines floor, ch1/ch6, comm. and auto floor from the interpreters busbar are applied to BU207 and directly connected with the M.D.B. via connector X201. To avoid that the D.C. levels on these lines via BU209 are applied to the transmitter, capacitors C202 to C217 are used. The amplified signals ch1/ch6 and floor, coming from the M.D.B., are via X201 connected to the distribution connector BU208.

The B.C.D. code for the Monitor part on the M.D.B. and the returning audio line are via X201 connected to the M.D.B. and via BU210 with the monitor equipment.

IC1 and IC2 ensure that 6 "channel occupied" information lines are provided to the transmitter connector BU 209 on the one side and to the monitor connector BU210. When a channel, e.g. ch1, is not occupied the D.C. voltage, provided by the int. mon. panel, is approximately 18v. In this case, the voltage on the -input of IC26 is larger then the voltage on the +input, ensuring that the comperator output is "0" (approx. 2,5v). When a microphone signal is switched to the channel, the D.C. voltage on the channel line becomes approximately 9v. The +input of the comperator IC26 is now larger (15v) then 9v on the -input. The output will be "1" which can be used as an indication that the channel is occupied.
This "1" is approx. 27v. A current of approx. 2.3 m.a. can be used to drive a L.E.D.

LBB 3203/00 Monitor Distribution Board (M.D.B.)



CONTENTS

Figures:

1. INTRODUCTION
(see fig. 1)

The Monitor Distribution Board has 8 output channels, floor, auto floor, and channels 1 to 6 inclusive, which are amplified by symmetrical amplifiers (3 Watt). Only the floor and channels 1 to 6 are, fed to the programme selector socket BU 208. BCD code information is fed to the monitor selector on the MDB via the remote socket, enabling channels 1 to 6, floor, auto floor to be monitored. The audio line can be connected to a monitor loudspeaker and the communication signal from the interpreters' desk is automatically fed to the monitor loudspeaker, independant of which channel is being monitored.

2. CIRCUIT DESCRIPTION OF MONITOR DISTRIBUTION BOARD
(see fig. 2)

The Monitor Distribution Board (MDB) provides the audio signal for the monitor loudspeaker. The desired channel for monitoring, can be selected by injecting its corresponding BCD code at the monitor socket BU 210. The channel selector switch, consisting of IC1 and IC2 is switched to the choosen channel via opto couplers, IC5 to IC8 and the schmitt-trigger IC4.
The BCD code controls the analoge multiplexers IC1 and IC2, this control line ensures that the selected channel of the interpreters' bus bar is switched to the loudspeaker via the monitor socket. Channels 1 to 6, floor and auto floor are fed to amplifiers IC101 to IC 801, and amplified to the 12 Volts output level. Channels 1 to 6 and floor only, are connected to the distribution socket for the programme selectors. The output of the amplifiers IC101 to IC801 are also fed via a resistor divider network (R18/R2, etc.) to the analoge multiplexers IC1 and IC2, which switch the selected channel, due to the BCD code fed to IC3a and IC3b.

The amplifier stage IC3, TS1 to TS4, applies the selected channel to the connector X201. Because the communication line is automatically injected into the amplifier, the signal will override the selected channel. The microphone signal from an interpreters' desk is switched to the communication channel, when the "COMM" button on the desk is pressed.

3. SPARE PARTS LIST

Spare parts list of Monitor Distribution Board (M.D.B.) LBB 3203/00

	Description	Code number
X 1	P.C. male connector 2 x 32P	5322 265 64104
C 8	470NF 20 % 35 V	5322 124 10319
C 12	100UF 20 % 35 V	5322 124 21389
C 13	100UF 20 % 35 V	5322 124 21389
C 14	6,8UF 20 % 25 V	5322 124 14081
C 15	6,8UF 20 % 25 V	5322 124 14081
C 16	6,8UF 20 % 25 V	5322 124 14081
C 17	6,8UF 20 % 25 V	5322 124 14081
C 109	100UF 20 % 35 V	5322 124 21389
C 110	100UF 20 % 35 V	5322 124 21389
C 111	470NF 20 % 35 V	5322 124 10319
C 209	100UF 20 % 35 V	5322 124 21389
C 210	100UF 20 % 35 V	5322 124 21389
C 211	470NF 20 % 35 V	5322 124 10319
C 309	100UF 20 % 35 V	5322 124 21389
C 310	100UF 20 % 35 V	5322 124 21389
C 311	470NF 20 % 35 V	5322 124 10319
C 409	100UF 20 % 35 V	5322 124 21389
C 410	100UF 20 % 35 V	5322 124 21389
C 411	470NF 20 % 35 V	5322 124 10319
C 509	100UF 20 % 35 V	5322 124 21389
C 510	100UF 20 % 35 V	5322 124 21389
C 511	470NF 20 % 35 V	5322 124 10319
C 609	100UF 20 % 35 V	5322 124 21389
C 610	100UF 20 % 35 V	5322 124 21389
C 611	470NF 20 % 35 V	5322 124 10319
C 709	100UF 20 % 35 V	5322 124 21389
C 710	100UF 20 % 35 V	5322 124 21389
C 711	470N 20 % 35 V	5322 124 10319
C 809	100UF 20 % 35 V	5322 124 21389
C 810	100UF 20 % 35 V	5322 124 21389
C 811	470NF 20 % 35 V	5322 124 10319
D 1	BZX79-B16	4822 130 34268
F 1	1 Amp T	4822 253 30021
IC 1	HEF4051BD	4822 209 10262
IC 2	HEF4051BD	4822 209 10262
IC 3	NE5532FE	5322 209 86234
IC 4	HEF40106BD	4822 209 10318
IC 5	CNX36	5322 130 90097
IC 6	CNX36	5322 130 90097

	Description	Code Number
IC 7	CNX36	5322 130 90097
IC 8	CNX36	5322 130 90097
IC 9	NE5534N	5322 209 86285
IC 101	NE5532FE	5322 209 86234
IC 201	NE5532FE	5322 209 86234
IC 301	NE5532FE	5322 209 86234
IC 401	NE5532FE	5322 209 86234
IC 501	NE5532FE	5322 209 86234
IC 601	NE5532FE	5322 209 86234
IC 701	NE5532FE	5322 209 86234
IC 801	NE5532FE	5322 209 86234
R 17	9 x IK 2 % 0,125 W	5322 111 90256
R 18	9 x IK 2 % 0,125 W	5322 111 90256
R 30	PTC 5E6 60 V	5322 116 40074
R 31	PTC 5E6 60 V	5322 116 40074
R 110	PTC 5E6 60 V	5322 116 40074
R 111	PTC 5E6 60 V	5322 116 40074
R 210	PTC 5E6 60 V	5322 116 40074
R 211	PTC 5E6 60 V	5322 116 40074
R 310	PTC 5E6 60 V	5322 116 40074
R 311	PTC 5E6 60 V	5322 116 40074
R 410	PTC 5E6 60 V	5322 116 40074
R 411	PTC 5E6 60 V	5322 116 40074
R 510	PTC 5E6 60 V	5322 116 40074
R 511	PTC 5E6 60 V	5322 116 40074
R 610	PTC 5E6 60 V	5322 116 40074
R 611	PTC 5E6 60 V	5322 116 40074
R 710	PTC 5E6 60 V	5322 116 40074
R 711	PTC 5E6 60 V	5322 116 40074
R 810	PTC 5E6 60 V	5322 116 40074
R 811	PTC 5E6 60 V	5322 116 40074
TS 1	BD237	4822 130 44235
TS 2	BD238	4822 130 40917
TS 3	BD237	4822 130 44235
TS 4	BD238	4822 130 40917
TS 5	BC547C	4822 130 44503
TS 6	BC557	4822 130 44256
TS 101	BD237	4822 130 44235
TS 102	BD238	4822 130 40917
TS 103	BD237	4822 130 44235
TS 104	BD238	4822 130 40917
TS 201	BD237	4822 130 44235
TS 202	BD238	4822 130 40917
TS 203	BD237	4822 130 44235
TS 204	BD238	4822 130 40917

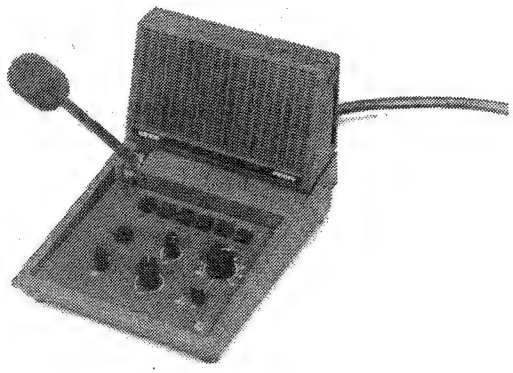
	Description	Code Number
TS 301	BD237	4822 130 44235
TS 302	BD238	4822 130 40917
TS 303	BD237	4822 130 44235
TS 304	BD238	4822 130 40917
TS 401	BD237	4822 130 44235
TS 402	BD238	4822 130 40917
TS 403	BD237	4822 130 44235
TS 404	BD238	4822 130 40917
TS 501	BD237	4822 130 44235
TS 502	BD238	4822 130 40917
TS 503	BD237	4822 130 44235
TS 504	BD238	4822 130 40917
TS 601	BD237	4822 130 44235
TS 602	BD238	4822 130 40917
TS 603	BD237	4822 130 44235
TS 604	BD238	4822 130 40917
TS 701	BD237	4822 130 44235
TS 702	BD238	4822 130 40917
TS 703	BD237	4822 130 44235
TS 704	BD238	4822 130 40917
TS 801	BD237	4822 130 44235
TS 802	BD238	4822 130 40917
TS 803	BD237	4822 130 44235
TS 804	BD238	4822 130 40917

Recommended spare parts list Monitor Distribution Board M.D.B. LBB 3203/00

	Description	Code Number
X 1	P.C. male connector 2 x 32p	5322 265 64104
D 1	BZX79-B16	4822 130 34268
IC 1	HEF4051BD	4822 209 10262
IC 2	HEF4051BD	4822 209 10262
IC 3	NE5532FE	5322 209 86234
IC 4	HEF40106BD	4822 209 10318
IC 5	CNX36	5322 130 90097
IC 6	CNX36	5322 130 90097
IC 7	CNX36	5322 130 90097
IC 8	CNX36	5322 130 90097
IC 9	NE5534N	5322 209 86285
IC 101	NE5532FE	5322 209 86234
IC 201	NE5532FE	5322 209 86234
IC 301	NE5532FE	5322 209 86234
IC 401	NE5532FE	5322 209 86234
IC 501	NE5532FE	5322 209 86234
IC 601	NE5532FE	5322 209 86234
IC 701	NE5532FE	5322 209 86234
IC 801	NE5532FE	5322 209 86234
R 811	PTC 5E6 60 V	5322 116 40074
TS 1	BD237	4822 130 44235
TS 2	BD 238	4822 130 40917
TS 3	BD 237	4822 130 44235
TS 4	BD238	4822 130 40917
TS 5	BC547C	4822 130 44503
TS 6	BC557	4822 130 44256
TS 101	BD 237	4822 130 44235
TS 102	BD 238	4822 130 40917
TS 103	BD 237	4822 130 44235
TS 104	BD 238	4822 130 40917
TS 201	BD 237	4822 130 44235
TS 202	BD 238	4822 130 40917
TS 203	BD 237	4822 130 44235
TS 204	BD 238	4822 130 40917
TS 301	BD 237	4822 130 44235
TS 302	BD 238	4822 130 40917
TS 303	BD 237	4822 130 44235
TS 304	BD 238	4822 130 40917
TS 401	BD 237	4822 130 44235

TS 402	BD 238	4822 130 40917
TS 403	BD 237	4822 130 44235
TS 404	BD 238	4822 130 40917
TS 501	BD 237	4822 130 44235
TS 502	BD 238	4822 130 40917
TS 503	BD 237	4822 130 44235
TS 504	BD 238	4822 130 40917
TS 601	BD 237	4822 130 44235
TS 602	BD 238	4822 130 40917
TS 603	BD 237	4822 130 44235
TS 604	BD 238	4822 130 40917
TS 701	BD 237	4822 130 44235
TS 702	BD 238	4822 130 40917
TS 703	BD 237	4822 130 44235
TS 704	BD 238	4822 130 40917
TS 801	BD 237	4822 130 44235
TS 802	BD 238	4822 130 40917
TS 803	BD 237	4822 130 44235
TS 804	BD 238	4822 130 40917

LBB 3221/00 6 Channel Interpreter´s Desk



CONTENTS:

Figures:

1. INTRODUCTION

The 6 channel interpreter's desk can be sub-divided into 4 sections:
(See Fig. 1)

Section 1. Microphone signal amplifier section

Section 2. Monitor section for headphone or loudspeaker

Section 3. Channel selection section
The microphone signal or floor signal will be switched by this section to a choosen channel of the interpreter's bus bar. The channel number is selected by means of switches S4 to S10.

Section 4. Audio sensing section
Controls the channel LED's, MIC LED and the AFL LED.

2. CIRCUIT DESCRIPTION 6 CHANNEL INTERPRETER´S DESK

(See block diagram Fig. 1 and circuit diagram Fig. 2a and b)

The block diagram Fig. 1 divides the circuit diagram Fig. 2a and b into 4 sections.

Section 1. Microphone section (IC1, 2, 7a, 12d, 13f, TS1, S2a, S1a and B1)

The microphone delivers a signal via pin 2 of X2 to the pre-amplifier IC1. The microphone receives a voltage of approximately 2 Volts via pin 1 of connector X2. The circuit TS1, D1, D2, D24, D25 and B1 are an automatic volume control A.V.C.
If the emitter voltage of TS1 falls below the reference voltage on the base of TS1 (via D24 or D25), then C3 is charged. C3 discharges through B1 as a result of which the amplification is restricted. In the case of fast peaks, C4 will discharge via B1. The microphone signal from the pre-amplifier IC1 is switched to the symmetrical amplifier IC2 by means of the microphone switch S1a or comm. switch S2a. When the microphone is off and none of the other interpreters´ desks use the choosen channel of this interpreter´s desk, then the floor signal (X1/X6 pin 1 and 14) will be connected via IC7a and b to the symmetrical amplifier IC2. IC7a and b are controlled by section 3 via IC12d. Section 3 senses whether the choosen channel of one desk is in use by other interpreters´ desks.

Section 2. Monitoring section (IC5, 6, 14, 15, T1, S3, S11 and TS2 to TS5)

The analoge multiplexers IC5 and 6 are controlled by means of switch S11 or S3c and IC16a. By means of the FL/AFL switch S3c, a choice can be made between monitoring the channels by means of S11 or monitoring the AFL channel. If the selection is made for monitoring the channels by means of S11 (S3 is open), then IC16a is disabled and S11 directly controls the multiplexer IC5 and 6. D4, D5 and D6 ensure that in the last three positions of S11 the multiplexer IC5 and 6 switches the floor signal to the monitoring section.
If switch S3 is set at FL/AFL monitoring (S3 is closed), then IC16a is enabled. The autofloor information from IC12d pin 14 of section 4 is now used to control the multiplexer IC5 and 6 via IC16a. If the auto floor (AFL) channel is not used, then pin 14 of IC12d is high and therefore pins 7, 5 and 3 of IC16a are high. The multiplexer, IC5 and 6, is controlled by IC16a and IC6 switches the floor signal to the headphone via T1, TC14 and 15.
When auto floor is used, pin 14 of IC12d is low. The multiplexer IC5 then switches the AFL channel to the headphone via T1, IC14 and 15.
In the case where the interpreter provides auto floor, then pin 14 of IC12d stays high and IC5 switches the floor to the headphone via T1, IC14 and 15. The choosen symmetrical channel goes via T1 to the assymmetrical operational amplifier IC14. Volume control is achieved by R28. The frequency response is

boosted at 4 kHz by C12, R24, R35 and C13. R33 is used to obtain tone control around 4 kHz. A signal is presented to the headphone via operational amplifier IC15 and TS2 to TS5 (X5). The booth loudspeaker can be connected to this signal via X3 pins 1 and 2. Section 3 ensures that the booth loudspeaker can be switched "on" and "off" (X3-5).

Section 3. Channel selection (IC3, 4, 7c, 10, 13a, b, c, e, 16b, S1b, S2b, S4 to S10)

With the interlocking switches S5 to S10a, the channel can be choosen for the microphone signal. Via R49, a logic "1" is present on pin 11 of IC13a except when the comm. button S2 is closed. When the comm. button is not used, then pin 8 at IC13b is at a logic "1" and the priority encoder IC10 receives the channel information from S5a to S10a. The code on the control lines pin 6, 7 and 9 from IC10 corresponds to the choosen channel by S5a to S10a. The control lines ensure that the multiplexer IC3 and 4 switches the microphone signal on pin 13 and 3 to the right channel on the interpreters' bus bar. When the comm. button is pressed, then pin 8 of IC13b is at a logic "0" S5a to S10a have no influence on IC10. All inputs of IC10 pin 1 to 3 and 10 to 13 are low except for pin 4, this is the combination for the comm. code. The control lines pin 6, 7 and 9 ensure that IC3 and 4 switch the microphone signal to the comm. channel. The purpose of R104 and R105 is to ensure that the d.c. signals on both sides of the switches IC3 and 4 are at the same magnitude (suppress transients).

Use of the AFL channel:
If, for example, via switch S4, channel 6 is selected then when the interpreter selects this channel by means of S10a, the microphone signal will be switched to the AFL channel via the analoge switch IC7c. The microphone signal is of course, also switched to channel 6 by IC3 and 4. The control lines of IC7c pins 12 and 6 come from switch S4. The purpose of R118 and R119 is to ensure that the d.c. signals on both sides of the switch IC7c are at the same magnitude. On all channels of the interpreters' bus bar, a d.c. voltage of 2/3 VB 18V6 is present (VB= power supply of 28V) These d.c. voltages come from the Central Supply Unit (int. / mon. panel).

If an activated microphone is switched on a channel, then the d.c. level of this channel becomes 1/3 VB 9V3 via S1b, D19, R100 and R101. For the AFL channel this will happen via S1b, D20, R102 and R103. When the comm. channel is used the d.c. level of 1/3 VB becomes via S2b, D16, D19, R100 and R101. This difference between the d.c. levels is used by section 4 of all interpreters' desks which detect these levels and switch on the LED's of the engaged channels.
The difference of d.c. levels is also used for switching the floor signal to the unused channels. IC12a detects the d.c. level of the selected channel of the interpreter's desk. When no other interpreter's desk uses this selected channel then

the d.c. level of this channel is 2/3 VB 18V6. IC12a detects this in pin 2 and pin 1 becomes low. Via the inverter IC13f the analoge switch IC7a and b are enabled. The floor signal goes now via the symmetrical amplifier IC2 to the multiplexer IC3 and 4 which switches it to the selected channel.
The booth loudspeaker is switched on and off by the interpreter´s desk which is set to "master" by switch S12b.
Only when no interpreter´s desk in the same booth has a switched on microphone, does the "master" interpreter´s desk switch on the booth loudspeaker via X3 and 5.
When the microphone switch is in the off position then IC16b is enabled via IC13e and S1b. Pin 13 of IC16b becomes high (21V5) and switches the booth loudspeaker on only when the control line send loudspeaker off. From the slaves via X1 pin 23 are high. The loudspeaker can be switched off via D21 when the comm. button S2b is used. The on/off microphone information from pin 11 of IC16b is used by section 4.

Section 4. Audio sensing section (IC11, 12a, b, c, IC8, IC9, D7 to D15 and TS9)

IC11, IC12a, b and c detect if a channel is used or not. When for example channel 1 is selected on an other interpreter´s desk and its microphone is on then the d.c. voltage on the line is 1/3 VB 9V3 (via R100, R101, D19 and S1b/S2b of the other desk). The audio signal will be cancelled by R69 and R70 so on pin 5 of IC11a only the d.c. voltage of 1/3 VB = 9V3 is available. This d.c. voltage is lower than the 12V7 on pin 6 so that pin 7 becomes low and LED D7, will light because the switch IC8a is disabled. In the case where the interpreter´s desk provides channel 1, there will be, via S5b, 21V5 present on pin 5 of IC11a. Pin 5 is now higher then pin 6 and therefore pin 7 becomes high so that the analoge switch IC8a is closed and D7 will not be lit. The voltage of 21V5 on S5b comes from section 3 IC16b pin 11 when the interpreter´s microphone is switched on.
For the auto floor channel the same principle is used as for channel 1 to 6. IC12d ensures, via the switch IC19d, that the AFL LED lights or not. When one of the other interpreters uses the AFL channel, then a d.c. voltage of 1/3 VB = 9V3 is present on this channel. IC12d detects this and pin 14 becomes low and D14 lights up. In the case where the interpreter provides auto floor, there will be, from S4 of section 3, 21V5 present on pin 12 of IC12d via D23 and R83. Pin 14 of IC12d becomes high and the AFL LED will not light up. Pin 14 of IC12d is also used by IC16a section 2 for monitoring the floor or auto floor channel via the headphone.

3. SPARE PARTS LIST

Spare parts list of 6 channel interpreter's desk LBB 3221/00

	Description	Code number
	Rubber foot	5322 462 40211
	Knob for AFL selector S4	5322 414 30084
	Cable and connector assembly X6	5322 321 21075
	Cable relief grommet	5322 325 64049
	Flat spring for microphone handle	5322 492 63142
	Connector for microphone X2	5322 268 40278
	Microphone capsule	5322 242 20094
C	100 PF 100 V for capsule	4822 122 31715
	Protective cap for microphone	5322 462 40728
	Wind up for microphone	5322 462 40731
	Cap and microphone handle assembly	5322 310 30601
	Microphone assembly	5322 310 30602
	Knob for comm. switch S2	5322 414 30083
	Tumbler knob for mic. switch S1	5322 414 30085
	Knob for channel selector switch S11	5322 414 30082
	Reducing bush for knob S11	5322 532 21041
	Cap black for knob S11 and R 28	5322 414 70002
	Knob for tone control R33	5322 414 30001
	Cap black for knob R33	5322 414 70001
	Knob for volume control R28	5322 414 30002
X 1	D Connector 25 P	5322 267 60147
X 2	Pin contact	5322 535 84341
S 5 TO S 10	Push switch	5322 276 60227
S 3	Tumbler switch FL/AFL	5322 277 10797
S 1	Tumbler microphone switch	5322 277 10798
S 12	Slide switch L.S.	5322 277 20986
S 2	Push switch	5322 276 20339
S 11	Rotary switch 10 positions	5322 273 30314
S 4	Rotary switch 7 positions	5322 273 30313
B 1	2F735	5322 130 34912
C 2	4,7UF 50 % 63 V	4822 124 20726
C 3	1000UF 50 % 10 V	4822 124 20768
C 4	15UF 10 % 16 V	4822 124 20977
C 10	470NF 20 % 35 V	5322 124 10319
C 11	15UF 10 % 16 V	4822 124 20977
C 14	3,3UF 20 % 35 V	5322 124 14067
C 15	100UF 50 % 40 V	4822 124 20715
C 16	100UF 50 % 40 V	4822 124 20715
C 17	100UF 50 % 40 V	4822 124 20715

	Description	Code number
C 18	6,8UF 20 % 25 V	5322 124 14081
C 19	47UF 50 % 25 V	4822 124 20699
C 20	33UF 40 % 10 V	4822 124 20945
C 21	10UF 50 % 16 V	5322 124 14066
C 22	10UF 50 % 40 V	4822 124 20708
C 23	10UF 50 % 40 V	4822 124 20708
C 24	10UF 50 % 40 V	4822 124 20708
C 25	10UF 50 % 40 V	4822 124 20708
C 26	15PF 2 % 500 V	4822 122 31197
C 27	15PF 2 % 500 V	4822 122 31197
C 28	10UF 50 % 40 V	4822 124 20708
C 29	10UF 50 % 40 V	4822 124 20708
C 30	10UF 50 % 40 V	4822 124 20708
C 31	10UF 50 % 40 V	4822 124 20708
C 38	10UF 50 % 16 V	5322 124 14066
C 43	10UF 50 % 16 V	5322 124 14066
D 1	BZX79-B8V2	4822 130 34382
D 2	BAW62	4822 130 30613
D 3	BZX79-B12	4822 130 34197
D 4	BAW62	4822 130 30613
D 5	BAW62	4822 130 30613
D 6	BAW62	4822 130 30613
D 7	CQW54	4822 130 32069
D 8	CQW54	4822 130 32069
D 9	CQW54	4822 130 32069
D 10	CQW54	4822 130 32069
D 11	CQW54	4822 130 32069
D 12	CQW54	4822 130 32069
D 13	CQW54	4822 130 32069
D 14	TIUG164	5322 130 32587
D 15	BZV46-1V5	5322 130 34865
D 16	BAW62	4822 130 30613
D 17	BZX79-B16	4822 130 34268
D 19	BAW62	4822 130 30613
D 20	BAW62	4822 130 30613
D 21	BAW62	4822 130 30613
D 22	BAW62	4822 130 30613
D 23	BAW62	4822 130 30613
D 24	BAW62	4822 130 30613
D 25	BAW62	4822 130 30613
IC 1	TDB0156DP	5322 209 82804
IC 2	NE5532FE	5322 209 86234
IC 3	HEF4052BD	4822 209 10263
IC 4	HEF4052BD	4822 209 10263

	Description	Code number
IC 5	HEF4052BD	4822 209 10263
IC 6	HEF4052BD	4822 209 10263
IC 7	HEF4066BP	5322 209 14104
IC 8	HEF4066BP	5322 209 14104
IC 9	HEF4066BP	5322 209 14104
IC 10	HEF4532BD	4822 209 10278
IC 11	LM324N	4822 209 80587
IC 12	LM324N	4822 209 80587
IC 13	HEF40106BD	4822 209 10318
IC 14	TDB0156DP	5322 209 82804
IC 15	NE5532FE	5322 209 86234
IC 16	HEF40097BD	4822 209 10317
R 4	Pot.meter 2K2 0,5 W	5322 101 14008
R 28	Carb. pot. 22K	5322 101 20799
R 33	Carb. pot 2K2	5322 101 20798
R 52	9 X 100K	5322 111 90599
R 109	PTC 5E6 60 V	5322 116 40074
T 1	Transformer	5322 140 60264
TS 1	BC547C	4822 130 44503
TS 2	BC639	4822 130 41053
TS 3	BC640	4822 130 41078
TS 4	BC639	4822 130 41053
TS 5	BC640	4822 130 41078
TS 6	BC547C	4822 130 44503
TS 7	BC557B	4822 130 44568
TS 8	BC557B	4822 130 44568
TS 9	BC547C	4822 130 44503
TS 10	BC547C	4822 130 44503
X 4	Micr. jack	5322 267 30609
X 5	Headphone jack	5322 267 30522

Recommended spare parts list 6 channel interpreter's desk LBB 3221/00

	Description	Code Number
	Rubber foot	5322 462 40211
	Knob for AFL selector S4	5322 414 30084
	Cable and connector assembly X6	5322 321 21075
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	Microphone capsule	5322 242 20094
C	100 PF 100 V for capsule	4822 122 31715
	Protective cap for microphone	5322 462 40728
	Wind up for microphone	5322 462 40731
	Cap and microphone handle assembly	5322 310 30601
	Microphone assembly	5322 310 30602
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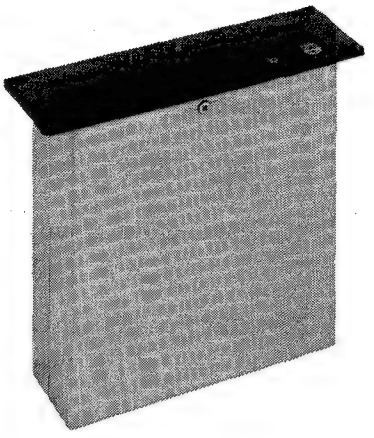
	Tumbler knob for mic. switch S1	5322 414 30085
	Knob for channel selector switch S11	5322 414 30082
	Reducing bush for kno S11	5322 532 21041
	Cap black for knob S11 and R28	5322 414 70002
	Knob for tone control R33	5322 414 30001
	Cap black for knob R33	5322 414 70001
	Knob for volume control R28	5322 414 30002
X 1	D Connector 25 P	5322 267 60147
X 2	Pin contact	5322 535 84341
S 5 to S 10	Push switch	5322 276 60227
S 3	Tumbler switch FL/AFL	5322 277 10797
S 1	Tumbler microphone switch	5322 277 10798
S 12	Slide switch L.S.	5322 277 20986
S 2	Push switch	5322 276 20339
S 11	Rotary switch 10 positions	5322 273 30314
S 4	Rotary switch 7 positions	5322 273 30313
B 1	2F735	5322 130 34912
C 3	1000UF 50% 10 V	4822 124 20768
D 1	BZX79-88V2	4822 130 34382
D 3	BZX79-812	4822 130 34197
D 7	CQW54	4822 130 32069
D 8	CQW54	4822 130 32069
D 9	CQW54	4822 130 32069
D 10	CQW54	4822 130 32069
D 11	CQW54	4822 130 32069
D 12	CQW54	4822 130 32069
D 13	CQW54	4822 130 32069

D 14	TIUG164	5322 130 32587
D 15	BZV46-1V5	5322 130 34865
D 17	BZX79-B16	4822 130 34268
IC 1	TD80156DP	5322 209 82804
IC 2	NE5532FE	5322 209 86234
IC 3	HEF4052BD	4822 209 10263
IC 4	HEF4052BD	4822 209 10263
IC 5	HEF4052BD	4822 209 10263
IC 6	HEF4052BD	4822 209 10263
IC 7	HEF4066BP	5322 209 14104
IC 8	HEF4066BP	5322 209 14104
IC 9	HEF4066BP	5322 209 14104
IC10	HEF4532BD	4822 209 10278
IC11	LM324N	4822 209 80587
IC12	LM324N	4822 209 80587
IC13	HEF40106BD	4822 209 10318
IC14	TDB0156DP	5322 209 82804
IC15	NE5532FE	5322 209 86234
IC16	HEF40097BD	4822 209 10317
R 4	Pot. meter 2K2 0,5W	5322 101 14008
R 28	Carb. pot. 22K	5322 101 20799
R 33	Carb. pot. 2K2	5322 101 20798
T 1	Transformer	5322 140 60264
TS 1	BC547C	4822 130 44503
TS 2	BC639	4822 130 41053
TS 3	BC640	4822 130 41078
TS 4	BC639	4822 130 41053
TS 5	BC640	4822 130 41078
TS 6	BC547C	4822 130 44503
TS 7	BC5578	4822 130 44568
TS 8	BC557B	4822 130 44568
TS 9	BC547C	4822 130 44503
TS10	BC547C	4822 130 44503
X 4	Micr. jack	5322 267 30609
X 5	Headphone jack	5322 267 30522

CONTENTS

LBB 3360/20 FLUSH MOUNTING DELEGATE'S UNIT



1. INTRODUCTION DELEGATE'S UNIT

The delegate's unit can be divided into 4 parts:

Part 1 Microphone amplifier
Amplifies and limits the microphone input signal.

Part 2 Audio amplifier
Amplifies the audio signal, and distributes it to the loudspeaker connection.

Part 3 Audio switch off circuit
Compares the audio signal, and the microphone signal. Automatically switches "off" the microphone, when there is no input from the delegate's unit for approximately 30 to 45 seconds.

Part 4 Microphone and loudspeaker switching circuit
Switches the microphone and loudspeaker on or off, depending on the status of the control signals. The control signals comprise of the microphone, remote, priority and disable request signals, plus the output signal from the auto switch off circuit.

2. CIRCUIT DESCRIPTION DELEGATE'S UNIT

(see circuit diagram)

When the system is switched "on", capacitor C33 charges to the supply voltage 27V. Resistors R48, and R50 causes the voltage on the + input 5 of IC3b to be lower than on the negative input 6. This state is valid until the power supply voltage reaches 18V. The difference negative voltage, between the negative input and the positive input of IC3, causes the comparator output to be 0V. This 0V is fed to the negative input 2 of IC3a, because the voltage on the positive input 3 is +6V, the comparator output will be high i.e. logic "1". Logic "1" resets the flip-flop IC5a. When switching on the system, if the supply voltage exeeds 15V, the zener diode D11 will conduct, causing the voltage at input 6, to remain at a constant level of 15V. If the power supply voltage exeeds 18V, the voltage at the input of IC3b pin 5, is higher than the 15V on input 6 causing a positive difference voltage, ensuring that the comparator no longer clamps the voltage to zero. 15V is applied to the negative input of IC3a, pin2, which is higher than the +6V on the positive input 3, therefore the output from the comparator is 0V (logic "0"). Logic "0" will no longer reset the flip-flop IC5, and the delegate unit is now ready for use.

Switching Control Circuit General

The switching control circuit IC5a, IC2d, IC3a,and IC4a/b carries out all the switching functions in the delegate unit. Switching is due to the state of the call microphone signal, priority, disable request and remote control lines, the microphone signal or the audio signal to the loudspeaker. IC5a is a flip-flop, who's output is logic "0" (0V) or logic "1" (15V) depending on its input signals. When the output is 0V, the microphone is switched "off" from the pre-amplifier to the audio line. When the output is 15V, the microphone signal via the pre-amplifier, will be switched to the audio line and the loudspeaker is switched "off".

The priority and disable request lines are via a comparator circuit connected to the reset and data input. The priority signal, when active, ensures that the flip-flop will be reset and the active disable request signal ensures that the data input becomes "0". The microphone call signal, from the microphone button, is applied to the clock input of IC5, and the remote call signal to the set input. The clock or set pulse can make the flip-flop output logic "1", causing the microphone to be switched "on" and the loudspeaker "off".

The audio comparator output, is connected via a comparator to the reset input of IC5. Therefore after the delay time of approximately 30 to 45 seconds, the flip-flop will be reset, and the switched "on" microphone is switched "off".

Listening

In the listening position, the switching control circuit, switches via the loudspeaker switching circuit the audio signal to the audio amplifier and to the loudspeaker. The microphone signal is disconnected from the line via the microphone switching circuit. During listening the clock input of IC5 is "low" because the call button has not been pressed. Because there is no priority, the priority line is at 27V. The voltage on the negative input 2 of IC3a, via D9, R34 and R36 is approximately 12V. Because the positive input is +6V, the compatator output is 0V. This 0V is applied to the reset input of IC5. The disable request, connected to pin 13 of IC2d is inactive, therefore the negative input is approximately 0V. The positive input to IC2d pin 12 is +10V therefore the comparator does not clamp the data input of IC5 to "low". At last there is no remote control, meaning that the remote line which is connected to the set input of IC5 is 0V and does not set the flip-flop.
The output of the flip-flop, which is at 0V, is connected via a resistor and capacitor network, to transistor TS5. This circuit forms the microphone switching circuit. 0V on the base of TS5 causes it to not conduct, therefore TS4 which is a part of the pre-amplifier is also non-conductive. The microphone signal on the base of TS4 therefore does not reach the audio line, and acts as if it were switched "off"
The loudspeaker switching circuit, consists of an external NPN transistor and a relay. The output of IC5 switches via the transistor the relay which has a break contact in serial with the loudspeaker.

Audio amplifier

The amplifier consists of IC1b, TS6, TS7 and associated components. The audio signal from the audio line is fed via C9 and R19 to the positive input of IC1b, the ground reference is fed to the negative input. The operational amplifier, amplifies the line signal. The output is a DC level of approximately 14 Volts on which the audio signal is superimposed. The balanced output stage TS7 and TS6 provide the current for driving a low impedance speaker.

Call position

In the call position, the microphone switching circuit is activated, by the switching control circuit. The microphone signal is fed via the Pre-amplifier and switched to the audio line. The loudspeaker is fed via the loudspeaker switching circuit, and switched "off" from the audio amplifier.

During a call, the clock input of IC5 is logic "1" because the call button is pressed. No priority or remote signals are present, therefore the reset input and the set input are at logic "0". Because disable request is inactive, the data input of IC5 stays "1". On the positive edge of the clock input, caused by the call button, this "1" will be clocked to the output. The inverse output will now be "0" and is fed back to the data input. This means that when the next clock pulse occurs, the output will go "low" again. The "1" on the output of the flip-flop is fed to the base of TS5 in the microphone switching circuit, causing it to conduct, whereby TS4 also will be conductive. Current can now flow via the emitter of TS4 to earth and LED D4 illuminates. The microphone signal is taken from the collector of TS4 and fed to the line.

Pre-amplifier

The pre-amplifier consists of IC1a, TS4 and associated components. A DC voltage is fed via TS1 and applied to the electret microphone line. The current flowing from TS1 to the electret microphone, ensures that the FET inside the microphone is conducting. The analogue microphone signal is applied by the microphone to the microphone line and fed via C1 and C2 to the + and - inputs of operational amplifier IC1a. C1 ensures that the DC voltage for the electret microphone, cannot reach the op-amp. A DC voltage of approximately 4V is fed via R5, R6 and R8 to the microphone signal on the inputs of IC1a. C2 ensures that this DC voltage is not influenced by TS2 and TS3. The output of the op-amp IC1a is fed back via R11/C48 to the - input and via the resistor between X2-5 and X2-6. The resistance value is dependant on the sensitivity of the electret microphone. In this way differences in sensitivity of the microphones are compensated. The amplified signal, a DC level of approximately 10V on which the audio signal is superimposed, is applied to the base of TS4.

Limiter

The limiter consists of TS2, TS3 and associated components. When the AC output signal of the op-amp IC1a reaches a value greater than 1.4V, D1 or D2 will conduct and so will TS2 or TS3. When either one of these transistors is conducting, the input signal to the pre-amplifier decreases. A sample of the current from the microphone flows via the conducting transistor to ground and the signal is limited.
The limiter is divided into two sections, the right section D2 and TS3 for the positive AC and the left section D1 and TS2 for the negative AC of the microphone signal.

Resetting "call" position

If the call button S1 is pressed again, IC5 receives another positive pulse on its clock input. The inverse output pin 2 was "low", and so is the data input of the flip-flop. After the clock-pulse the "0" will appear on the output, therefore the inverse output will go "high" and so will the data input. This "low" output disables the microphone signal and enables the connected speaker.

Priority

When the chairman requires priority over the delegate microphones, the priority line is at about 1.5V. Due to R37 and R99 1V is applied to the - input of IC3a. Because of the 6V on the + input the comparator output is at about 15V, which is logic "1". Via the reset input IC5 is now reset. The set input remains at "0" and the data input becomes "1". The flip-flop output was "1" but will now go "low" and the microphone signal is switched off. As long as the priority line stays on 1.5V the reset input of IC5 stays "high" and clock pulses from the call button will have no influence on the flip-flop and the microphone remains switched off.

Disable request

When the adjusted number of microphones are switched on simultaneously, the disable request line reaches approximately 27V. This 27V is applied to the - input of IC2d. Because the + input is at +10V the output of the comparator becomes 0V. The data input which is on +15V is now clipped to 0.7V, which is logic "0" to the flip-flop. When the microphone is switched "on" this "0" will be clocked to the output, but because the output already was "low" the status of the delegate will not change. During the disable request the microphone can be switched off by pushing the call button.
When the number of switched "on" microphones is less than the maximum number, the disable request line becomes 0V. The output from the comparator IC2d is no longer clamping the data input to zero. The delegate unit is now in the listening mode and the delegate is able to switch "on" his microphone by pressing the call button.

Remote control

When a central control desk is included in the system, the call button can also be used as a microphone request button. This can only be achieved, when the control desk is in manual mode.

Three situations exist: 1 No central control deks connected.
2 Central control desk connected, and positioned in the auto mode.
3 Central control desk in the manual mode

When a central control desk is connected in the auto mode, the remote line is higher than 2/3V+. When no desk is connected resistor R38, which is connected to V+ (27V) ensures that the remote line is higher than 2/3V+. The remote line is fed via C29, and connected to the set input of the flip-flop. C29 ensures that the DC voltage is blocked, and the set input is "0". The delegate is able to switch "on" or "off" his microphone via the call button as usual. When the central control desk is in the manual mode, the voltage on the remote line is lower than 2/3V+. The flip-flop IC5a is not set due to capacitor C29. Because the - input is 2/3V+, the output is now 0V. When the delegate presses his call button, the output of IC5a becomes 15V, but is clamped behind R59 by IC4a and D10a which will illuminate. The 15V output of the flip-flop is also applied to the base of TS9, which causes it to conduct. Current now flows from the request line, this is a sign for the central control desk that a request has been made. The operator of the central control desk makes the remote line higher than 2/3V+, the output of the comparator IC4a then becomes 15V, and the voltage at R59 is no longer decreased, therefore the 15V is applied to the base of TS5. The microphone will be switched "on" and the loudspeaker "off".

The operator is also able to switch "on" a delegate microphone, even though the delegate has not requested it. The voltage on the remote line is now switched from a value much lower than 2/3V+, to a value greater than 2/3V+ (about V+). Because of the fast rise time and the high voltage step, this pulse passes through the differentiation network C29 and R45 and sets the flip-flop IC5 via the set input. The output of the flip-flop is now "high" and the microphone is switched "on".

The operator is able to switch "off" the microphone, by switching the voltage on the remote line from a value greater than 2/3V+, to a voltage much less than 2/3V+, via C26 to the - input of IC3a, which is 27V when there is no priority and is reduced to below 6V for a short moment during the voltage drop. This results in a reset pulse from IC3a being fed to the reset input of IC5a and the microphone is switched off.

When the central control desk is used, the priority line from the chairmans unit is not connected to the other delegate units, but to the central control desk. When a chairman presses his "priority button", two situations exist: the central control desk is in manual, or in auto mode.
In manual mode, the central control desk generates a DC level, which is greater than the 6V, but lower than the 2/3V+ (18V) on the priority line. This voltage is then fed to the + input of IC4b, ensuring that the comparator output is 0V. When the microphone is switched on, the voltage on the anode of D10 and resistor R59 is decreased and the microphone is switched off.
When the priority button is released by the chairman, the priority line becomes approximately 27V and the output of IC4b goes to 15V, therefore the voltage on the anode of D10 is no longer reduced and the microphone is switched on again. So when the control desk is in manual mode, priority from the chairman doesn't switch off the microphone but only mutes it.

In the "auto mode" the microphone is switched off when the chairman takes priority and remains off when the priority button is released again. In auto mode the central control desk generates a DC level lower than 6V on the priority line after a priority call. This voltage is then fed to the - input of IC3a and because the + input is at +6v, the comparator output is 15V and resets the flip-flop. When the priority is released, the priority line goes to 27V. The output of IC3a is now at 0V, and the flip-flop is no longer reset, the microphone remains switched off and the delegate unit is now in the listening position.

Audio level comparator

The audio level comparator ensures that when a delegate does not speak into his microphone for approximately 30 to 45 seconds, the flip-flop IC5 will be reset via comparator IC3a.

At input 3 of IC2a a DC level of approximately 9V is applied. The microphone signal is fed to the - input of IC2a. The op-amp substracts the microphone signal from the DC level and amplifies the resulting signal. The output signal is now at a 9V DC level on which the amplified microphone signal is superimposed. This signal is then fed to the - input of IC2b; on the + input the audio signal from the disable request line is applied which is superimposed on a 9V DC level from R28. The output of IC2b is the result of the substraction of the microphone signal and the line signal superimposed on a 9V DC level. This output voltage can reduce the voltage on X. The output of IC2a, which is a 9V DC level with the microphone signal superimposed on, can reduce the voltage on Y. When only the delegate is using his unit, the line signal will be the same as the microphone signal and the AC difference voltage at the output of IC2b is 0V, only the 9V DC level is on the output. The voltage on X is now the 9V plus the forward voltage of D6, adding up to a total of 10V. When more than one delegate is speaking, the line signal is greater than the microphone signal.

The difference voltage on the output of IC2b ensures that the 10V on X is reduced.
If the delegate unit is silent, there is no microphone signal, therefore the AC voltage on the 9V DC level at the output of IC2a is 0V. The voltage on Y is at 9V plus the forward voltage of D7 which is 10V. When the delegate microphone is in use, the negative going part of the microphone signal ensures that the 10V on Y is reduced.
X is applied to the + input of IC2c and Y to the - input. When X is greater than Y, the output of the op-amp is at 15V and when Y is greater than X the output is 0V. Therefore when the delegate uses his microphone (he has to speak louder when others are using their microphones) the output of IC2c will be 15V and charges C24. When the delegate stops speaking, the output of IC2c will be 0V and C24 discharges via R35. The voltage on C24 is fed via R36 to the - input of IC3a, when the voltage becomes lower than 7V, the comparator output which was on 0V becomes 15V and resets flip-flop IC5 and the microphone is switched off.
The time taken for C24 to discharge from 15V to 7V is approximately 30 to 45 seconds. When the microphone is switched off, the output of IC2c becomes 15V independant of the number of other switched on microphones. This is because Y is pulled down to 1V by the output of flip-flop IC5a via diode D8.
By placing jumper S3 in the a-b position, C24 cannot discharge and the audio comparator is disabled.

Pos.:	Description:	Code number:
	PCB CONNECTOR 8 PENS	5322 530 84092
	DELEGATE CABLE ASSY	5322 321 21658
	PCB ASSY	5322 214 90027
	KNOB	5322 414 20129
C1-28	10nF 50V	4822 122 32442
C2-10-17-27-40-44-45	100nF 50V	5322 122 32839
C3-20	10uF 25V	4822 124 21732
C4-6-8-15-21-22	4.7uF 25V	5322 124 21966
C5	0.47uF 25V	4822 124 21453
C7	47uF 10V	5322 124 21975
C9	3.3nF 50V	4822 122 31969
C11	47pF 50V	4822 122 31772
C12-13-23-25-30-31	100pF 50V	4822 122 31765
C14-35	22uF 25V	4822 124 21646
C18	82nF 50V	5322 122 32838
C24	100uF 25V	4822 124 20701
C26-29	4.7nF 50V	4822 122 31784
C32-36	47uF 25V	4822 124 20699
C33	47uF 40V	4822 124 20713
C47	22nF 63V	4822 122 31797
C48	470pF 63V	4822 122 31727
D1-2-5-6-7-8-9-12-13-17	DIODE BAV70	5322 130 34331
D3	BZX84-C5V1	5322 130 32835
D11	BZX84-C15	5322 130 33662
D19	BZV46-2V0	4822 130 31248
D20	BZX79-B30	4822 130 34328
D21	BZX84-C6V2	5322 130 33671
D10A	TIUG164	5322 130 32587
D4A	CQW54-V1	5322 130 32704
IC1	LF353N	5322 209 81395
IC2	LM324FP	5322 209 71598
IC3-4	LM393FP	5322 209 71599
IC5	HEF4013BT	5322 209 14477
R1-96	5K6 0.126W	4822 111 90572
R2-5-46	47K 0.125W	4822 111 90543
R3	390E 0.125W	5322 111 90138
R4-11-13-72-99	10K 0.125W	4822 111 90249
R6-29-52	33K 0.125W	5322 111 90267
R7-30-34-42-47	1K 0.125W	5322 111 90092
R8	220K 0.125W	4822 111 90197
R9	220E 0.125W	4822 111 90178
R12-15-19-22-24-28-36-39-40-41-43-45-49-53-55-60-95-97	100K 0.125W	4822 111 90214
R14	560E 0.125W	5322 111 90113

R16	1K5 0.125W	4822 111 90151
R17-58	12K 0.125W	4822 111 90253
R18-32-33-37-44-102-103	1M 0.125W	5322 111 90094
R20-26-31	18K 0.125W	4822 111 90238
R21	100E 0.125W	5322 111 90091
R23	22K 0.125W	4822 111 90251
R27	39K 0.125W	5322 111 90108
R35	4K7 0.125W	5322 111 90111
R38	10M 0.125W	5322 111 91141
R48	150K 0.125W	5322 111 90099
R50	27K 0.125W	4822 111 90542
R51-93	68K 0.125W	4822 111 90202
R54	PTC	5322 116 44008
R56-57-104	15K 0.125W	4822 111 90196
R59	2K7 0.125W	4822 111 90569
R82-83	3K9 0.125W	4822 111 90571
R92	82K 0.125W	4822 111 90575
R94	680E 0.125W	4822 111 90162
R98	390E 2.5W	5322 116 54401
S3	LINK,JUMPER	5322 290 60298
S3	JUMPER SOCKET,MALE	5322 265 64028
S1	SWITCH,PUSH BUTTON	4822 276 11188
TS1-3-4-5	BC847C	5322 130 42755
TS2	BC857C	5322 130 42756
TS6-8-9	BC817-40	4822 130 42615
TS7	BC807-40	5322 130 60123
X9	DIN SOCKET	5322 267 54107
	8-P DIN PLUG,MALE	5322 265 40535

2. CIRCUIT DESCRIPTION DELEGATE UNIT

(see circuit diagram)

When the system is switched "on", capacitor C33 charges to the supply voltage 27V. Resistors R48, and R50 cause the voltage on the + input 5 of IC3b to be lower than on the negative input 6. This state is valid until the the power supply voltage reaches 18V. The difference negative voltage, between the negative input and the positive input of IC3, causes the comparator output to be 0V. The 0V is applied to the negative input 2 of IC3a, because the voltage on the positive input 3 is +6V, the comparator output will be high i.e. logic "1". Logic "1" resets the flip-flop IC5a. when switching on the system, if the supply voltage exeeds 15V, the zener diode D11 will conduct, causing the voltage at input 6 to remain at a constant level of 15V. If the power supply voltage exeeds 18V, the voltage at the input of IC3b pin 5, is higher than the 15V on input 6 causing a positive difference voltage, ensuring that the comparator no longer clamps the voltage to zero. 15V is applied to the negative input of IC3a, pin2, which is higher than the +6V on the positive input 3, therefore the output from the comparator is 0V (logic "0"). Logic "0" will no longer reset the flip-flop IC5, and the delegate unit is now ready for use.

Switching Control Circuit General

The switching control circuit IC5a, IC3a and IC6 carries out all the switching functions in the chairmans unit. Switching is due to the state of the call microphone signal, priority, and remote control lines, the microphone signal or the audio signal to the loudspeaker. IC5a is a flip-flop, who's output is logic "0" (0V) or logic "1" (15V) depending on its input signals. When the output is 0V, the microphone is switched "off" from the pre-amplifier to the audio line. When the output is 15V, the microphone signal via the pre-amplifier, will be switched to the audio line and the loudspeaker is switched "off".

The microphone call signal, from the microphone button, or from the microphones remote control line via IC6, is fed to the clock input of IC5. The clock input to IC5 causes the Q output to go "high", therefore the microphone will be switched on and a connected loudspeaker off. The priortity signal from the priority call button is fed to TS10 and TS11, which ensures that when the priority button is pressed, the microphone is switched on and a 1.5V DC level is switched via the priority line to the delegate units or central control desk when used.

Listening

In the listening position, the switching control circuit, switches via the loudspeaker switching circuit the audio signal to the audio amplifier and to the loudspeaker. The microphone signal is disconnected from the line via the microphone switching circuit. During listening the clock input of IC5 is "low" because the call button has not been pressed and no remote call via IC6 has been applied. Because there is no set pulse, the output of the flip-flop remains "low". This output is connected to TS5, which forms the microphone switching circuit. 0V on the base of TS5 causes it to not conduct, therefore TS4 which is a part of the pre-amplifier is also non-conductive. The microphone signal on the base of TS4 therefore does not reach the audio line, and acts as if it were switched "off"
The loudspeaker switching circuit, consists of an external NPN transistor and relay. The output of IC5 switches via the transistor the relay which has a break contact in series with the loudspeaker.

Audio amplifier

The amplifier consists of IC1b, TS6, TS7 and associated components. The audio signal from the audio line is fed via C9 and R19 to the positive input of IC1b, the ground reference is fed to the negative input. The operational amplifier, amplifies the line signal, and the output is a DC level of approximately 14 Volt on which the audio signal is superimposed. The balanced output stage TS7 and TS6 provides the current for driving a low impedance speaker.

Call position

In the call position, the microphone switching circuit is activated by the switching control circuit. The microphone signal is fed via the Pre-amplifier and switched to the audio line. The loudspeaker is fed via the loudspeaker switching circuit, and switched "off" from the audio amplifier.

The inverting output of flip-flop IC5, which is "high" in the listening position, is fed back to the data input. On the positive edge on the clock input, caused by the call button, this "1" will be clocked to the output. The inverse output will now be "0" and is fed back to the data input. This means that when the next clock pulse occurs, the output will go "low" again. The "1" on the output of the flip-flop is fed to the base of TS5 in the microphone switching circuit, causing it to conduct, whereby TS4 will also be conductive. Current can now flow via the emitter of TS4 to earth and LED D4 illuminates. The microphone signal is taken from the collector of TS4 and fed to the line.

Pre-amplifier

The pre-amplifier consists of IC1a, TS4 and associated components. A DC voltage is fed via TS1 and applied to the electret microphone line. The current flowing from TS1 to the electret microphone, ensures that the FET inside the microphone is conducting. The analogue microphone signal is applied by the microphone to the microphone line and fed via C1 and C2 to the + and - inputs of operational amplifier IC1a. C1 ensures that the DC voltage for the electret microphone, cannot reach the op-amp. A DC voltage of approximately 4V is fed via R5, R6 and R8 to the microphone signal on the inputs of IC1a. C2 ensures that this DC voltage is not influenced by TS2 and TS3. The output of the op-amp IC1a is fed back via R11/C48 to the - input and via the resistor between X2-5 and X2-6. The resistance value is dependant on the sensitivity of the electret microphone. In this way differences in sensitivity of the microphones are compensated. The amplified signal, a DC level of approximately 10V on which the audio signal is superimposed, is applied to the base of TS4.

Limiter

The limiter consists of TS2, TS3 and associated components. When the AC output signal of the op-amp IC1a reaches a value greater than 1.4V, D1 or D2 will conduct and so will TS2 or TS3. When either one of these transistors is conducting, the input signal to the pre-amplifier decreases. A sample of the current from the microphone then flows via the conducting transistor to ground and the signal is limited.
The limiter is divided into two sections, the right section D2 and TS3 for the positive AC, and the left section D1 and TS2 for the negative AC of the microphone signal.

Resetting "call" position

If the call button S1 is pressed again, IC5 receives another positive pulse on its clock input. The inverse output pin 2 was "low", and so is the data input of the flip-flop. After the clock-pulse the "0" will appear on the output, therefore the inverse output will go "high" and so will the data input. The "low" output disables the microphone signal and enables the connected speaker.

Priority

When the chairman requires priority over the delegate microphones, he presses button S2 continuously. TS11 will conduct, together with TS10. The voltage on the collector of TS10 rises to approximately 15V, thereby switching the microphone signal on the line and a connected loudspeaker off. Due to TS11 conducting, the priority line via D14, D18 and R63 is connected to ground causing it to be at 1.5V. This 1.5V switches the delegate microphones off.
When the priority button is released, TS10 and TS11 will no longer conduct causing the micophone signal to be no longer switched to the line, therefore the priotity line will again be on 27V.

Disable request

Because the chairman must always be able to switch on his microphone, the microphone switching circuit is not influenced by the disable request line.

Remote control

Only when a central control desk is connected to the system, the microphone call function can be remotely controlled. The chairman can not request a remote control call by using a request line, but must somehow attract the attention of the control desk operator. The remote line which is at 15V due to resistor R75 is reduced. This voltage is applied to the negative input of IC6. Because the voltage on the positive input is higher, the output will be on 15V and the microphone will be switched on.

Pos.:	Description:	Code number:
	PCB CONNECTOR 8 PENS	5322 530 84092
	DELEGATE CABLE ASSY	5322 321 21658
	PCB ASSY	5322 214 90028
	KNOB	5322 414 20129
C1-28-37-38	10nF 50V	4822 122 32442
C2-10-39-40-44-47	100nF 50V	5322 122 32839
C3	10uF 25V	4822 124 21732
C4-6-8-15	4.7uF 25V	5322 124 21966
C5	0.47uF 25V	4822 124 21453
C7	47uF 10V	5322 124 21975
C9	3.3nF 50V	4822 122 31969
C11	47pF 50V	4822 122 31772
C12-13-25-30-31	100pF 50V	4822 122 31765
C14-35	22uF 25V	4822 124 21646
C32-36	47uF 25V	4822 124 20699
C33	47uF 40V	4822 124 20713
C48	470pF 63V	4822 122 31727
D1-2-5-12-15-18	DIODE BAV70	5322 130 34331
D3	BZX84-C5V1	5322 130 32835
D11	BZX84-C15	5322 130 33662
D14	BYW56	5322 130 34973
D16	BZV49-C6V2	5322 130 33672
D19	BZV46-2V0	4822 130 31248
D20	BZX79-B30	4822 130 34328
D21	BZX84-C6V2	5322 130 33671
D4A	CQW54-V1	5322 130 32704
IC1	LF353N	5322 209 81395
IC3	LM393FP	5322 209 71599
IC5	HEF4013BT	5322 209 14477
IC6	UA741CFP	5322 209 71597
R1	5K6 0.126W	4822 111 90572
R2-5-46-65	47K 0.125W	4822 111 90543
R3	390E 0.125W	5322 111 90138
R4-11-13-66-72	10K 0.125W	4822 111 90249
R6-29-52-69	33K 0.125W	5322 111 90267
R7-30-34-42	1K 0.125W	5322 111 90092
R8	220K 0.125W	4822 111 90197
R9	220E 0.125W	4822 111 90178
R12-15-19-22-24-28-36-43-45-49-53-55-60-61-62-68-70-75-97	100K 0.125W	4822 111 90214
R14	560E 0.125W	5322 111 90113

R16	1K5 0.125W	4822 111 90151
R17-58	12K 0.125W	4822 111 90253
R18-32-33-37-44-67-102-103	1M 0.125W	5322 111 90094
R20-26-31	18K 0.125W	4822 111 90238
R21	100E 0.125W	5322 111 90091
R23	22K 0.125W	4822 111 90251
R27	39K 0.125W	5322 111 90108
R35	4K7 0.125W	5322 111 90111
R48	150K 0.125W	5322 111 90099
R50	27K 0.125W	4822 111 90542
R51-93	68K 0.125W	4822 111 90202
R54-63-71	PTC	5322 116 44008
R56-57	15K 0.125W	4822 111 90196
R59	2K7 0.125W	4822 111 90569
R92	82K 0.125W	4822 111 90575
R94	680E 0.125W	4822 111 90162
R98	390E 2.5W	5322 116 54401
S1-2	SWITCH,PUSH BUTTON	4822 276 11188
TS1-3-4-5	BC847C	5322 130 42755
TS2-10	BC857C	5322 130 42756
TS6-8-9-11	BC817-40	4822 130 42615
TS7	BC807-40	5322 130 60123
X9	DIN SOCKET	5322 267 54107
	8-P DIN PLUG,MALE	5322 265 40535

Distance piece d1 with associated bolts is delivered together with the LBB 3302/00.

Distance piece d2 with associated bolts is delivered together with the LBB 3301/00.

5. RECOMMENDED SPARE PARTS LIST P.C.B.'s

Basic P.C.B., LBB 3300/..	5322 216 93789
Connector panel, LBB 3300/..	5322 216 93791
Microphone plug-in PCB, LBB 3302/00	5322 216 93792
6ch desk PCB, LBB 3221/00	5322 216 93767
P.C.B., LBB 3350/00	5322 216 93844
P.C.B., LBB 3351/00	5322 216 93845
P.C.B., LBB 3450/00	5322 216 93845
P.C.B., LBB 3451/00	5322 216 93845
P.C.B., Loudspeaker unit	5322 216 93759

The LBB 3203/00, M.D.B., cannot be delivered via Concern Service in Eindhoven under any service codenr., but has to be ordered under typenr. in Breda when needed for service purposes.

CONTENTS

Figures:

1. CCS400 AUDIO PRINCIPLE

In the C.S.U. the mixing amplifier IC4a amplifies and mixes the different inputs (chime, telephone coupler, tape recorder and line in) TS14 and associated circuitry act like a current modulator. I_{ac1} is a modulated current according to U_{ac1}.

Every delegate unit consists of the same circuitry. IC1a amplifies the microphone signal and TS4 and associated circuitry act like the current modulator. I_{ac2} is amodulated current according to U_{ac2}. I_{ac3} is a modulated current according to U_{ac3}, etc. I_{act} in the C.S.U. is directly proportional with $I_{ac1} + I_{ac2} + I_{ac3} + \ldots$.
The very high impedance on the audio line ensures that the resistance value of S101 does not affect I_{act}. $U_{ac} = I_{act} \times R$, I_{act} is independant of R (S101).
U_{ac} is directly proportional with R.

By changing R with switch S101, U_{ac} changes. The AC voltage on the audio line, U_{act} which is the "audio signal", can be adjusted via S101, which actually changes the value of R The audio signal level can be changed in steps of 3dB.

At the input of amplifiers A, B and C in the C.S.U., the U_{ac} is constant and cannot be adjusted by changing the R value via S101.

In the delegate unit (and chairmans unit) the AC voltage on the audio line is amplified by $IC1_b$ when the microphone is switched off.

2. GENERAL SYSTEM TEST

- Check if the voltage selector is in the correct position.

- Check mains fuse (2.5a slow).

- If problems arise in the audio distribution, check if the 6-position system gain rotary switch is in the correct position.
  If the delegate unit don't switch off automatically after approximately 30 seconds of no speech activity, then check if the rotary switch for selecting the maximum number of microphones is in the "auto position".

- When using the 6 channel interpreters equipment, check if the interpreters desks are adjusting accorded to the instructions in the installation manual.

- If a tape recorder is used in the system, ensure that the input level potentiometer is adjusted correctly (screwdriver adjustment on the front side).
  To match the output to a DIN-type connector, or a Cinch connector, the inpedance must be adjusted by S5 to respectively high ohmic or to low ohmic.

- When using a telephone coupler, ensure if the jumper S4 is in the correct position for enabling or disabling the side tone reduction.
  Check if S2 for telephone input level and S6 for conference output level are adjusted in the right position.
  At last ensure that the telephone coupler itself is adjusted correct for being compatible with CCS400.

- Using the line input, ensure that the jumper S3 is in the correct position for the desired input level.

- Using the line output, check if the system gain rotary switch is in the correct position for the desired output level.

3. TEST INSTRUCTIONS CCS400

1. Adjust the voltage adapter at the local mains voltage.

2. Load DEL1 (BU101-7, 8) so that the consumed current is 0.55A.

   Load DEL2 (BU104-7, 8) so that the consumed current is 0.15A.

   Load INT (BU207-24, 12) so that the consumed current is 1A.

   Requirement: output voltage: 26,5 v ± 2v.

   Load DEL1 so that consumed current is 0.15A.
   Load DEL2 so that consumed current is 0.55A.

   Requirement: output voltage: 26,5 v ± 2v.

3. Shortcircuit the power suply output DEL1.
   (BU101-7), DEL2 (BU104-7) and INT (BU207-24) alternately (the load remains connected).
   Check the short-circuit current.
   Requirement: ≤ 150 MA
   Remove the short circuit. Requirement: power supply voltage: 26,5 v ± 2v.

4. Remove the three loads (DEL1, DEL2 and INT).
   Measure the power supply output voltage:
   requirement: 26,5 ± 2v.

Audio measurements Master Gain switch S101 at minimum

1. Line input
   Source impedance: 1 Kohm
   Control the line input BU103-1/BU103-3 with a signal of -4 dB (Jumper S3 in a-b position).
   Measure the signal at BU104-3.
   Requirement: amplification -17,5 dB ± 0,5 dB.

   Secundary side of T1: approx. -28 dB.
   - Input IC4a: approx. -72 dB
   Output IC4a : approx. -8,5 dB
   BU104-3: 21,5 dB ± 0,5 dB.
   Control the line input BU103-1/BU103-3 with a signal of + 6 dB (jumper S3 in a-c position)
   Requirement: amplification -28 dB ± 2 dB.
   Secundary side of T1: approx. -29 dB.
   - Input IC4a: approx. -68 dB.
   Output IC4a: approx. - 9,5 dB.
   BU104-3: -22 dB ± 2 dB.

2. Tape play back input
Adjust R104 at minimum (left) or at maximum (right).

Control one ot the two symetrical tape recorder inputs BU106-3 or BU106-5 with a signal of +20 dB or -8 dB.

Measure the signal at BU104-3.

	R 104 minimum		R 104 maximum	
	input +20dB	input -8dB	input +20dB	input -8dB
-Input IC4a	- 59 dB	- 86 dB	- 7 dB	- 69 dB
Output IC4a	+ 4 dB	- 24,5	+ 18 dB	- 7 dB
BU104-3	_ 9 dB	- 37 dB	+ 3 dB	- 20 dB
Amplification	- 29 dB	- 29 dB	- 17 dB	- 12 dB

Requirements: amplification with R104 minimum $\leq$ - 40 dB.
amplification with R104 maximum - 12 dB $\pm$ 0,5 dB.

3. a. Tel. coupler input
Source impedance < 100 Ohm.

Control the input BU105-5 with a signal of -16 dB, -4 dB or + 6 dB.

Measure the signal at BU104-3

	S2 in pos.a-c input -16dB	S2 in pos.a-b input -4 dB	S2 in pos.b-d input + 6 dB
+ of C 35	- 16 dB	- 16 dB	- 15,5 dB
-Input IC4a	- 70 dB	- 70 dB	- 69 dB
Output IC4a	- 8,5 dB	- 8,5 dB	- 8 dB
BU104-3	-21,6 dB	- 21,6 dB	- 21 dB
Amplification	-5,25 dB	- 17,25 dB	- 26,75
	$\pm$ 0,5 dB	$\pm$ 0,5 dB	$\pm$ 0,5 dB

b. Tel. coupler output

Load the output BU105-4 with 10 K Ohm.
Jumper S4 in AC position.

Control the input BU105-5 with a signal of -16 dB, -4 dB or + 6 dB.
Measure the signal at BU105-4.

	S6 in pos.a-c input -16 dB	S6 in pos.a-d input -4 dB	S6 in pos. b-c input + 6 dB
BU 105-4	- 16 dB	- 4 dB	+ 6 dB
Amplification	0 dB	0 dB	0 dB

Amplification requirement: + 0,5 dB ± 1 dB.

Side tone reduction: put jumper S4 in a-b position.

Control the input BU105-5 with a signal of -16 dB.
Measure the signal at BU105-4.
Jumper S2 in position a-c.
Jumper S6 in position a-c.

+ of C35	- 16 dB
- Input IC4a	- 70 dB
Output IC4a	- 8,5 dB
- Input IC4b	- 80 dB
Output IC4b	- 16 dB
- Input IC7b	approx. -80 dB
Output IC7b	- 47 dB

Amplification: -47 dB -(- 16 dB) = -31 dB.

Side tone reduction: 31 dB
Required amplification: ≤ -20 dB.
Required side tone reduction ≥ 20 dB.

4. Line output

Control the tape recorder Play back input BU106-3 or BU106-5 with a signal so that at BU104-3 a signal of -21 dB is present. Ensure that the Master Gain switch S101 is positioned at minimum. Load the line output with 10 k Ohm parallel with 1,5 nF. (connect BU102-1 and BU102-3 together).

Measure at the line output.

Requirement: -6,5 dB. Amplification with respect to BU104-3 is
+ 14,5 dB ± 0,5 dB.

Tape rec. play back input BU106-3 or BU106-5: + 6 dB
- Input IC4a: - 78 dB
Output IC4a: - 8 dB
+ Input IC3a: - 21,4 dB
Output IC3a: - 1,5 dB
Line output : - 6,5 dB

5. Interpreters floor

Control the tape recorder play back input BU106-3 or BU106-5 with a signal, so that at BU104-3 a signal of -24 dB is present. Ensure that the Master Gain switch S101 is positioned at minimum.

Measure at the floor output BU207-1 or BU207-14.

Requirement: amplification with respect to BU104-3 is + 17 dB ± 0,5 dB.

Tape rec. play back input BU106-3 or BU106-5: + 3 dB.
- Input IC4a : - 75 dB
Output IC4a : - 11 dB
+ Input IC3b : - 32,5 dB
Output IC3b : - 2 dB
BU207-1 : - 7 dB
Amplification: + 17 dB

6. Tape recorder output

Control the tape recorder play back input BU106-3 or BU106-5 with a signal, so that at BU104-3 a signal of -21 dB is present. Ensure that the Master Gain switch S101 is positioned at minimum.

Jumper S5 in position a-b: output impedance is 220 kOhm (unloaded).

Load the tape recorder output BU106-1 or BU106-4 with 1 k Ohm and measure this output.

Requirement: amplification with respect to BU104-3 is - 49 dB ± 0,5 dB.

Jumper S5 in position a-c: output impedance is approx. 600 Ohm (unloaded)

Load the tape recorder output BU106-1 or BU106-4 with 1 k Ohm and measure this output.

Requirement: amplification with respect to BU104-3 is -6 dB ± 0,5 dB.

7. Disable request output

Control the tape recorder play back input BU106-3 or BU106-5 with a signal, so that at BU104-3 a signal of -21 dB is present.

Measure the signal at the disable request output BU104-2.

Requirement: output at BU104-2 is -26,5 dB ± 0,5 dB.

8. Gain reduction circuit

Load BU104-3 for DC only.
Adjust the load so that the AC-signal at BU104-3 will be attenuated 3 dB ± 0,5 dB by IC6.
(control e.g. the tape recorder play-back input with an AC-signal).

Perform this in every position of Master Gain switch S101.

9. Disable request circuit

Load BU104-3 for DC only.
Adjust the load so that the DC level at BU104-2 changes over.
Ensure that S102 is in one of the positions 1, 3 or 6 microphones and in "auto off".

With a load > 3.9 k Ohm the DC level is approx. 1.6 v.
Requirement: < 3v

With a load < 3.9 k Ohm the DC level is approx. 24.5 v.
Requirement: > V _ 3 v
= > 24 v

The direct current, through the load when the DC level is high:

2.65 mA ± 0,8 mA, 16,6 mA ± 2 mA, 30,5 mA ± 3,5 mA (dependant of position S 102).

Control the "limiter on/off" input BU101-5 with a DC-voltage. When the DC-level at BU104-3 is high (24v).

Requirements: input BU101-5 is 3v, BU104-3 remains high (24v).
input BU101-5 is 15v, BU104-3 becomes low (3v).
the limiter is now switched "off" the disable request line is inactive low.

10. Priority signal

Connect a load between BU104-1 and BU104-8 adjust this load so that the current is 0.2 mA. The voltage at the base of TS10 is in this case to low, the priority signal will not be generated.

Adjust the load so that the current is 0,3 mA.
The voltage at the base of TS10 now starts the oscillator circuit and the priority tone will be heard when a delegate unit is connected.

11. Monitor circuit

Node BU210-2, -11, -3, -10, -4 and -12 together and connect this point via an ampere meter to BU210-5 (ground).
Control successively the points BU207-20, -22, -19, -17, -16 and -10 with a voltage of 17v (with respect to e.g. BU209-12).

Requirement: the current < 0,1 mA
which corresponds to "channel not engaged".

Control now successively the same points with a voltage of 15v (with respect to e.g. BU209-12).

Requirement: the current is 2,5 mA ± 0,5 mA which corresponds to "channel engaged".

Load BU210-13 with a resistor of 330 Ohm (to BU210-5).

Requirement: Voltage at BU210-13 is 5v ± 0,5v.

REPLACING ADJUSTMENT RESISTOR

By changing the microphone capsule in a delegate unit, chairmans unit the amplification of the microphone signal in this units must be adjusted again. The amplification of the microphone amplifier $IC1_a$ must be adapted to the sensitivity of the microphone capsule. This can be done by placing the correct resistor between X2-5 and X2-6 in the feed back path. of IC1a.

Adjust procedure

Use a reference unit which is already adjusted correctly e.g. one unit of the whole system. Connect this unit to the DEL1 socket of the C.S.U. or connect X10-7 (+) and X10-8 (-) to a 27v power supply. Place at a distance of approximately 30 cm an audio generator (e.g. sinus signal) with a frequency of 1 KHz. Adjust the level of the generator so that at mp7 in the reference unit -7 dB occur. This -7 dB level must be measured with respect to the electrical ground X10-8. This "reference level" at mp7 corresponds to a S.P.L. of 85 dB, which is now generated by the audio generator.

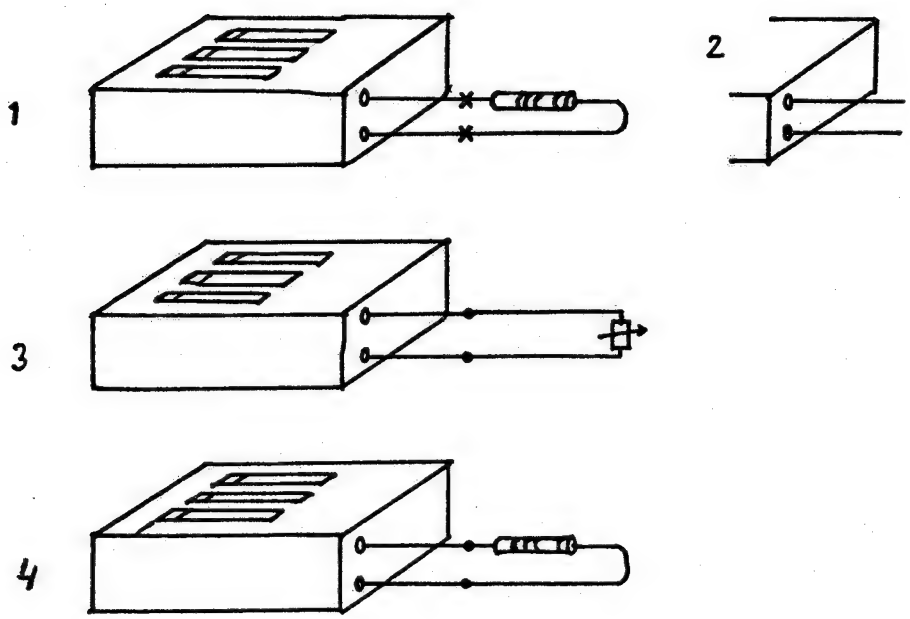
Replace the reference unit by the unit which has to be adjusted. Between X2-5 and X2-6 of the unit a potentiometer or a decade resistor instrument (both 0 to 50 K ohm) must be placed instead of the "old" resistor. Adjust the potentiometer or decade instrument so that at mp7 in the unit a level of -7 dB occurs. Replace the potentiometer or decade instrument by a 1% resistor of the same value. With this "new" resistor between X2-5 and X2-6 the unit is correctly adjusted, the microphone signal amplification is now adapted to the sensitivity of the "new" microphone capsule in the unit.

The minimum resistance between X2-5 and X26 is 3K6.
The sensitivity of the microphone capsule is maximum.
The maximum resistance is 43K, the microphone capsule sensitivity is minimum.
These maximum and minimum resistance values count for the delegate unit, chairmans unit and for the microphone LBB3175/00 (for FM systems).

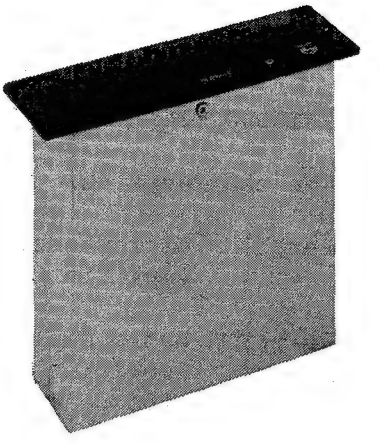
For the handmicrophone LBB 3175/50 the following min. and max. resistance values apply
minimum resistance value is 2K and maximum 43K.

4. MOUNTING AND DISMOUNTING THE C.S.U.

For system block diagram see fig. 2 and 3.
For mounting and dismounting the C.S.U. and the P.C.B.'s in this unit see fig. 4.



LBB 3361/20 FLUSH MOUNTING CHAIRMANS UNIT



1. INTRODUCTION CHAIRMANS UNIT

The chairmans unit can be didided into 3 parts:

Part 1 Microphone amplifier
Amplifies and limits the microphone input signal.

Part 2 Audio amplifier
Amplifies the audio signal, and distributes it to the loudspeaker connection.

Part 3 Microphone and loudspeaker switching circuit
Switches the microphone and loudspeaker on/off, depending on the status of the control signals. The control signals comprise of the microphone, remote and priority signals.

DISMOUNTING P.C.B.'s

Dismounting the various P.C.B.'s from the C.S.U. housing must be carried out in the following sequence:

1. Basis P.C.B.
2. Microphone plug-in unit LBB 3302/00 (only if added to the C.S.U.)
3. Monitor Distribution Board LBB 3203/00 (only if added to the C.S.U.)
4. Connector panel and Int. + monitor panel LBB 3301/00 (only if added to the C.S.U.) simultaneously

For mounting the P.C.B.'s into the C.S.U. place them in the inversed sequence.

1. Basic P.C.B.

   - Unscrew bolts 1.1, 1.2, 1.3 and 1.4 (1.1 only when a LBB 3302/00 is added to the system).
   - Unscrew next the two bolts 1.5 and 1.6.
   - Finally take out the P.C.B. by pulling X2 out of X102.

2. Microphone plug-in unit + distance piece d1 LBB 3302/00.

   - Unscrew bolts 2.2 and 4.4.
   - Take out the P.C.B. by simply pulling X3 out of X101.

3. Monitor Distribution Board LBB 3203/00

   - Unscrew bolts 3.1 and 3.2 (distance piece d2 remains fitted in the C.S.U.).
   - Pull the P.C.B. out of connector X201.

4/5. Connector panel and Int. + monitor panel LBB 3301/00

   - Unscrew bolts 4.1 until 4.5 inclusive.
   - Remove the two dial knobs on the front side of the C.S.U.
   - Unscrew next the bolts 5.1, 5.2 and 5.3.
   - Remove the connector panel and the LBB 3301/00 simultaneously now and separate them by pulling X103 out of X203.

Adding a P.C.B. LBB 3302/00 to the system

- Unscrew the two bolts 6.1 and 6.2.
- Remove the plate P1.
- Add the LBB 3302/00 to the system by pushing X3 into X101.
- Screw the bolts 2.2 and 4.4.
- Finally screw bolt 1.1 in the distance piece via the basic P.C.B.

Adding a P.C.B. LBB 3301/00 to the system

- Unscrew the two bolts 7.1 and 7.2.
- Remove the plate P2.
- Disconnect the basic P.C.B. as described in 1.
- Disconnect the LBB 3302/00 as described in 2. (only if added to the C.S.U.).
- Disconnect the connectorpanel as described in 5.
- Add the LBB 3301/00 to the system by pushing X203 into X103 (from connectorpanel).
- Place next the connector panel and the LBB 3301/00 simultaneously in the C.S.U. housing.
- Screw bolts 4.1 until 4.5 inclusive and bolts 5.1 until 5.3 inclusive.
- Place the basic P.C.B. back by plugging X2 into X102 (on connector panel).
- Screw bolts 1.2, 1.3, 1.4, 1.5 and 1.6.
- Place back the LBB 3302/00 (only if added to the system) by plugging X3 into X101 (on connectorpanel).
- Screw the bolts 1.1, 2.2 and 4.4.

Adding the LBB 3302/00 to the system

- Plug the LBB 3203/00 into X201.
- Place the distance piece d2 between the LBB 3203/00 and the bracket (in the C.S.U.) by the two bolts 3.2 and 3.3.
- Finally screw bolt 3.1.

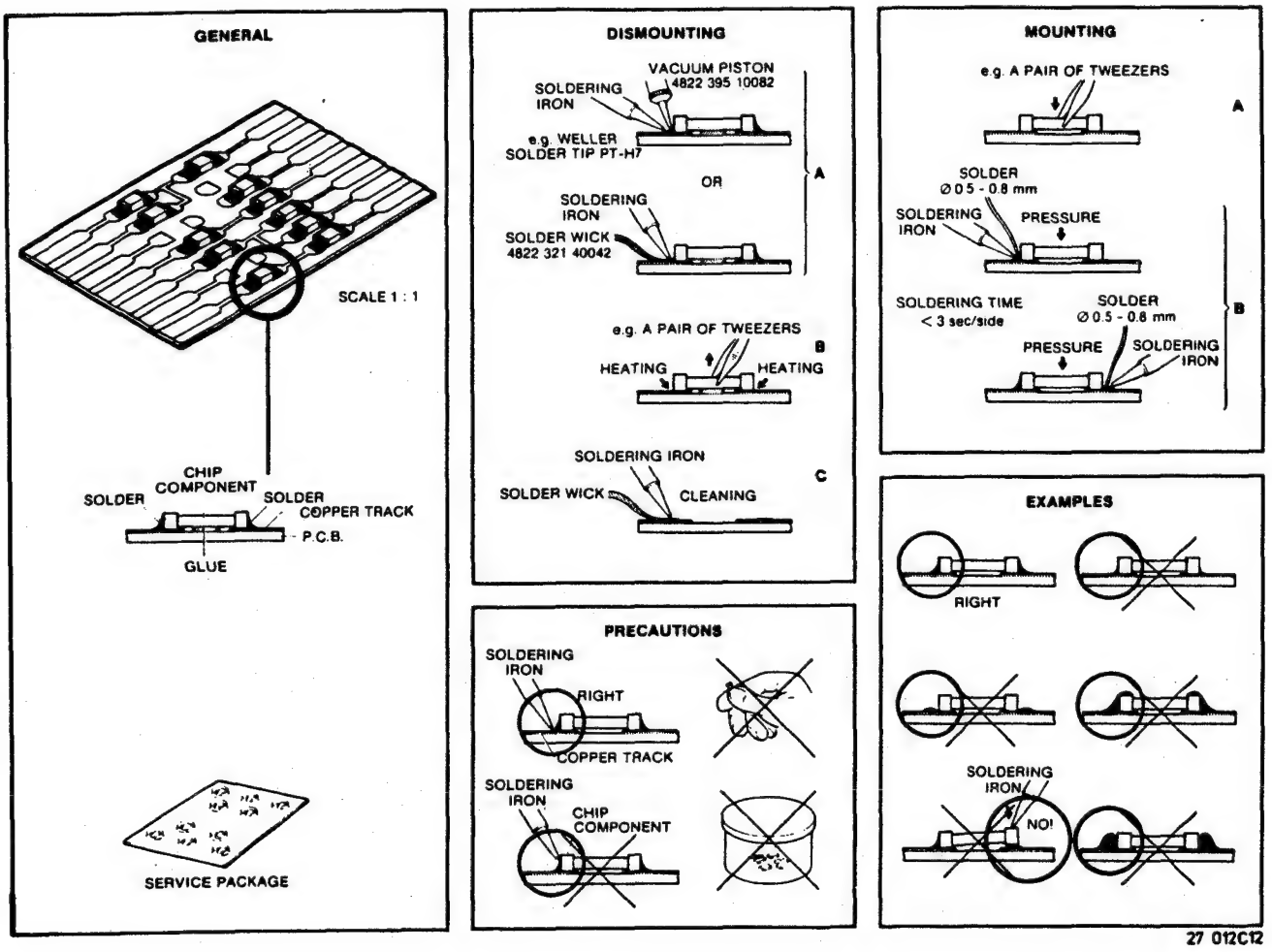
CONTENTS

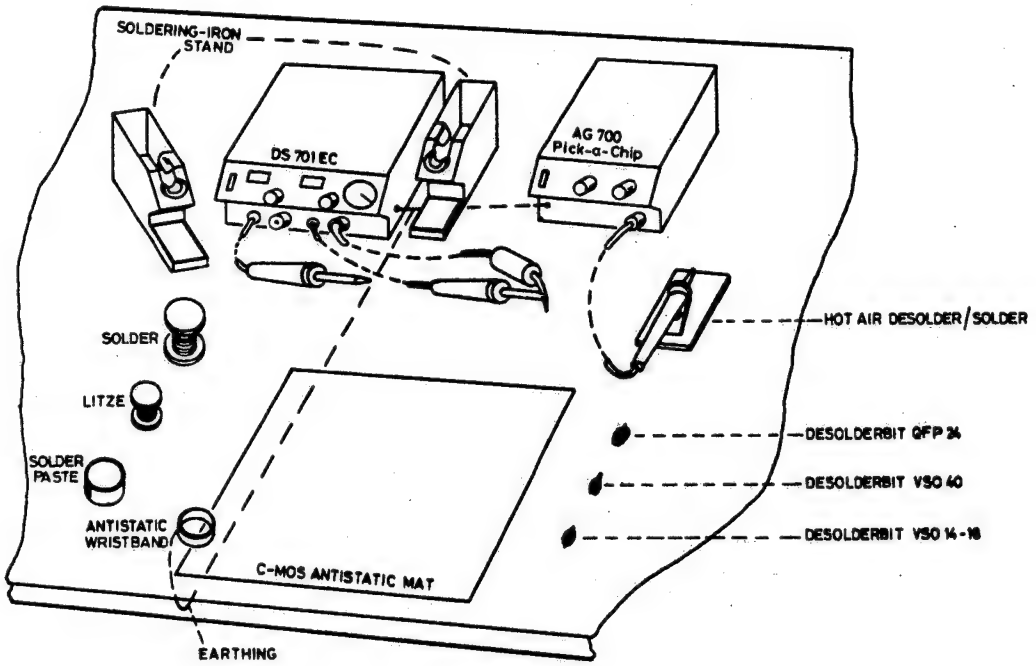
1. SOLDERING AND DESOLDERING OF SMD´s

Introduction

This description gives you a method for replacing surface mounted devices (SMD´s) and incorporates subjects such as:

- required tools and materials
- how to arrange the SMD-workshop
- general hints for SMD-handling
- interchanging SMD´s with two or three connections
- interchanging SMD´s with four or more connections





Arrangement of working area for SMD exchange

Required tools and materials

The following tools are necessary:
- A hot-air soldering/desoldering station for components with two or three leads: Weller AG 700 pick-a-chip.
- A vacuum, temperature controlled, soldering/desoldering station for components with four or more connections: Weller DS 701 EC.
- Desoldering accessories that can be attached to the Weller DS 701 EC-equipment.
- A working area that has been secured against electro static discharge (ESD).
- A pair of tweezers.

The following material is necessary:
- "Fluittin" solder.
- Solder paste.
- Components; since not all the components are marked, they must be kept in their original packing in order to avoid interchanging them.
- Desoldering braided wire.

General hints for SMD-mounting

- Protection against ESD: since the working area must be suitable for repair of MOS-devices, some precautions must be taken. All repairs must be done earthened which means that the repair surface, the soldering iron and the technician must be connected to the earth potential. This is achieved by using a C-MOS antistatic mat that must be connected to earth. The serive-technician is connected to earth by wearing an antistatic wristband.
- Components: desoldered components cannot be used again since desoldering is done at a temperature of 350 degrees Celcius while they can only withstand 240 degrees Celcius for max. 10 sec. Keep the new components as long as possible in their original packing in order to avoid damage and mixing up new and old SMD´s.

- For an optimal supply of heat a working area must be used that does not lead away the heat: the antistatic mat meets this requirement.

Interchaning SMD´s with two or three connections

IMPORTANT:
Before removing the component, observe very carefully its position in order to avoid that the new component is installed upside-down. This is especially important for capacitors where the metalisation at both ends is longer at the PCB side than at the top side.

Use the equipment Weller AG 700 pick-a-chip and proceed as follows:

- Heat the component up equably with hot air of 350 degrees Celcius.
- Remove the component with a pair of tweezers.
- Clean the PCB tracks, on which the new component has to be soldered, with braided wire or with the use of the vacuum desoldering equipment DS 701 EC.
- Put solder paste on the connections of the new component and position it on the PCB.
- Solder the component on to the PCB with the solder described in the materials list. Soldering temperature must 240 degrees Celcius, soldering time must not exceed 3 sec. per connection. The tip of your soldering iron must not touch the component, but must touch the PCB track close to the component.

Interchanging SMD´s with four or more connections

Use the equipment Weller DS 701 EC and attach a suitable desoldering piece. Then proceed as follows:

- Adjust the desoldering temperature to 350 degrees Celcius and place the desoldering piece on the IC that has to be removed.
  Take care that all connections of the IC are equally heated up).
- Switch the vacuum on and lift the component from the PCB.
- Clean the PCB tracks, on which the new component has to be soldered, with braided wire or with the use of the vacuum desoldering equipment DS 701 EC.
- Put solder paste on the connections of the new component and position it on the PCB.
- Position the component by soldering first the outside connections in a crosswise manner. Soldering temperature must be 240 degrees Celcius. Keep soldering time as short as possible.
- Solder not the other connections.
- If necessary you must remove superfluons rests of solder with the use of braided wire.

2. TECHNICAL SPECIFICATIONS

Power supply general:

Mainswitch (a)
Power on LED (n)
Voltage adapter (c,d): 110, 127, 220 and 240 Volt ± 10%
Fuse (b)
Mains cord: 170 cm
Supply voltage: 26,5 ± 2 Volt
Max. current consumption of discussion distribution and interpreter systems: ≤ 1,7 Amp.

Delegate connectors (BU101 and BU104)

Two 8-pole female 270° DIN connectors (e,f) to interconnect the delegate units to the system.

Connections:

BU101-1; BU104-1	Priority input Priority and chime activate: current sink ≥ 0,3 mA Level manual priority mode : 5,5 to approx. 2/3 Ub Volt
BU102-2; BU104-2	Disable request Request enabled : ≤ 3 V disabled : ≥ Ub - 3 V Output impedance: 10 kOhm On this line a AC voltage is superimposed for the automatic microphone switch-off circuit.
BU101-3; BU104-3	Floor line (live) DC level : approx. 10 Volt Max. line current: 40 mA Line AC impedance: 168E to 972E ± 5% (in 6 steps) This value decreases approx. 30% when two or more microphones are switched on.
BU104-4; BU104-4	Floor line (ground reference) This line is the AC ground reference ADC voltage is superimposed for the micr. auto switch off circuitry auto off : 0 V auto on : 9 V
BU101-6	Not connected
BU104-5	Power supply for central control desk
BU101-5	Disable max. number of switched-on microphones Disable level : > 9 Volt
BU104-6	Not connected

BU101-7; BU104-7 Positive supply voltage

BU101-8; BU104-8 Negative supply voltage
For capacity of the power supply see limits of the system.

Line output (BU102)

5-pole 180°	female DIN connector (g)
BU102-4	Not connected
BU102-2	Ground reference
BU102-5	Not connected
BU102-1, 3	Floating output
	Output impedance : < 200 E
	Load impedance : > 10 K
	Output level (gain switch -12 dB) : -4 to +6 dB

Line input (BU103)

5-pole 180°	female DIN connector (h)
BU103-4	Not connected
BU103-2	Ground reference
BU103-5	Not connected
BU103/1, 3	Floating input
	Input impedance : > 10 K
	Input level : presettable -4 dB or +6 dB by an internal jumper

Telephone coupler (BU105)

7-pole 270°	Female DIN connector (i)
BU105-1,2,3	Not connected
BU105-4	Output (to coupler)
	Impedance : ≤ 50 E
	Level : -16, -4, +6dB ± 1 dB presettable
BU105-5	Input (from coupler)
	Impedance : 6K, 24K, 71K ± 10%
	Level : -16, -4, +6dB ± 1dB presettable
BU106-6	Negative supply voltage
BU107-7	Positive supply voltage

Tape recorder connector (BU106)

5-pole 180°	Female DIN connector (j)
BU106-1	Output (to recorder)
	Impedance : 510 E or 220 K ± 10% presettable
	Level : -24 dB
BU106-2	Ground reference
BU106-3	Playback input left (from recorder)
	Impedance : > 30 K
	Level : -8 dB to +21 dB adjustable with

potmeter (k)

BU106-4	Interconnected with BU106-1
BU106-5	Playback input right (from recorder) Specifications see BU106-3

Interpreter system connector (BU207)

25-pole female lockable D-connector (r)
(Only when LBB 3301/00 is placed in the central)

BU207-1, 14	Floorline
BU207-2, 16	Channel 2
BU207-3, 15	Auto floor channel
BU207-4, 18	Channel 1
BU207-5, 17	Channel 3
BU207-6, 20	Channel 6
Bu207-7, 19	Channel 4
BU207-8, 22	Channel 5
BU207-9, 21	Communications interpreters
BU207-10	Protected ground
BU207-11,23	Not connected
BU207-12,13	Negative supply voltage
BU207-24,25	Positive supply voltage See limits of the system

Distribution connector (BU208)

15-pole female lockable D-connector (q)
(Only when LBB 3301/00 and LBB 3203/00 are placed in the central)

BU208-1, 10	Channel 6
BU208-2, 9	Channel 5
BU208-3	Not connected
BU208-4, 12	Channel 4
BU208-5, 11	Channel 3
BU208-6, 14	Channel 2
BU208-7, 13	Channel 1
BU208-8, 15	Floor channel Unloaded level : 24 dB Load impedance : > 50 E

Transmitter connector (BU209)

25-pole female lockable D-connector (s)
(Only when LBB 3301 is placed in the central)

BU209-1, 14	Floorchannel
BU209-2, 16	Channel 2
BU209-4, 18	Channel 1
BU209-5, 17	Channel 3
BU209-6, 20	Channel 6
BU209-7, 19	Channel 4
BU209-8, 22	Channel 5
BU209-9, 21	Communication interpreters
BU209, 24	Not connected

BU209-12,13	Ground reference	
BU209-3	Channel 3 }	
BU209-10	Channel 1 }	
BU209-11	Channel 5 }	Channel occupied
BU209-15	Channel 6 }	indicator lines
BU209-23	Channel 2 }	
BU209-25	Channel 4 }	

Monitor connector (BU210)

15-pole female lockable D-connector (p)
(Only when LBB 3301 and LBB 3203/00 are placed in the central)

BU210-1, 9	Loudspeaker output	
	Unloaded level	: +24 dB
	Load impedance	: > 50 E
BU210-6	Not connected	
BU210-13	Supply voltage 5 Volt	
BU210-14,7,15,8	Monitor select lines Ao, A1, A2 and A3	
BU210-2	Channel 6 }	
BU210-3	Channel 4 }	channel occupied
BU210-4	Channel 3 }	indicator lines
BU210-5	Ground ref. }	
BU210-10	Channel 3 }	
BU210-11	Channel 5 }	
BU210-12	Channel 1 }	

LBB 3302/00 Roving microphone plug in unit

9-pole female squeeze to release D-connector
6-pole interequipment connector

This unit is a P.C.B. that has to be installed in the LBB 3300/00. Microphone switch, red micr. on and green micr. request LED are provided in the handmicrophone.

Electrical specification

Supply voltage : 20 - -28V
Supply current : typ 9,5 mA
Frequency range : 150 Hz - -12,5 KHz
Additional current consumption micr. on: 6 mA ± 1 mA

Microphone channel

Nominal input level micr. : 85 dB S.P.L. ± 1,25 dB
Overload input level micr.: 110 dB S.P.L. ± 1,25 dB
Nominal output current : 0,41 mA
Gain reduction at overload input level: 18,5 dB ± 1,5 dB
Distorsion at nominal input level : < 0,5%
Distorsion at overload input level : < 5%
Frequency response (without micr. gain rel to 1 KHz) : 40 Hz : -10 ± 2 dB
150 Hz : -1,5 ± 1 dB
12,5 Hz : -0,5 ± 1 dB

Equivalent noise input : < 32 dB (A) S.P.L.

External microphone

Nominal input level (without micr.)	: -39 dB
Adjustment range	: ± 4 dB
Input impedance at nominal level	: 240 K - ± 5%
Electret voltage	: 9V ± 1V
Electret drain resistor	: 5 K6 ± 5%
Led current	: 3,5 mA ± 0,5 mA

Table top equipment

LBB 3350/00	Delegate unit with loudspeaker
LBB 3450/00	Delegate unit without loudspeaker
LBB 3351/00	Chairman unit with loudspeaker
LBB 3451/00	Chairman unit without loudspeaker

Interconnection facilities

1. A cable (l=180 cm) with 8-pole male DIN connector for connection to the preceding delegate unit or to the central equipment e.g. LBB 3300/00.
2. A 8-pole female DIN socket for connection of the next delegate unit (loop-through).
3. A concentric 3,5 mm jack for connection of aux. equipment.

Electrical specification

Supply voltage	: 20 - 28 V
Supply current (stand by)	: del. unit typ 8mA; chairman's unit typ 7mA
Frequency range	: 150 Hz - -12,5 KHz
Additional current consumption micr. on:	6mA ± 1mA

Microphone channel

Nominal input level micr.	: 85 dB S.P.L. ± 1,25 dB
Overload input level micr.	: 110 dB S.P.L. ± 1,25 dB
Nominal output current	: 0,41 mA
Gain reduction at overload input level	: 18,5 dB ± 1,5 dB
Distorsion at nominal input level	: < 0,5%
Distorsion at overload input level	: < 5%
Frequency response (without micr. gain rel 1KHz)	: 40 Hz : -12 ± 2 dB
	150 Hz : -1,5 ± 1 dB
	12,5 Hz : -0,5 ± 1 dB
Equivalent noise input	: <32 dB (A) S.P.L.

Loudspeaker amplifier

Input impedance	: > 1M
Gain	: 20,75 dB ± 0,75 dB
Distorsion at Vo +19 dB	: < 1,5%
Frequency response rel 1KHz:	150 Hz : -1 ± 0,75 dB
	12,5 Hz : -2 ± 0,75 dB
Equivalent input noise level:	< -89,5 dB
Rate load impedance	: 150 E

Loudspeaker sound pressure : 75 ± 2 dB S.P.L. at 0,5 m and -12 dB input (only LBB 3350 and LBB 3351)

Interconnection cables

LBB 3305/00

Extension cable for table top and flush mounting units.

Cable	: 8-pole brown standard cable.
Connectors	: male and female 8-pole DIN, no lock.
Length	: 5 meters

LBB 3203 M.D.B. (Monitor Distribution Board)

1. General

The M.D.B. contains nine amplifiers. Eight amplifiers are used to drive 8 lines for wired distribution, one of them is used as a monitor amplifier and this one can select one of the eight channels by a remote controlled electronic switch. The amplifiers are protected against short circuits.

2. Interconnection facilities

A 96-pole male Eurocard connector.

3. Electrical specifications

1. General

Supply voltage	: 27 V ± 0,5 V
Current consumption	: typ 80 mA. max. 160 mA (stand-by)
Frequency range	: 150 Hz - 12,5 kHz

All outputs are protected against short circuits.

2. Channel amplifier

Input impedance (B10-A11)	: > 20 K
Output impedance	: < 10 E
Load impedance	: > 50 E
Gain 500 Hz	: 32 dB ± 0,5 dB
Gain freq. response	: 150 Hz, -0,5 ± 1 dB
(rel. 500 Hz)	12,5 kHz, -0,5 ± 1 dB
Eq. noise input voltage	: < -114 dB (A)
Distorsion V_1 = -9 dB	: < 0,2%
V_o max.	
(d = 5%, f = 500 Hz)	: > +24,5 dB

3. Monitor amplifier

Input impedance comm. input (A31-B31)	: > 7 K6
Input impedance comm. input (A32-B32)	: 200 K ± 5%
Input imp. (C18-C19)	: > 10 K
Output imp. (C16-C17)	: < 10 E (500 Hz - 12,5 kHz)
Gain:	
- channel output > to mon. output (C16-C17)	: 0 dB ± 1 dB (200 E resistor between A 31 and B31)
- Comm. input (A32-B32) to mon. output (C16-C17)	: 3,5 ± 0,5 dB
- input (C18-C19) to mon. output (C16-C17)	: 32 ± 0,5 dB (200 E resistor between A 31 and B31)
- comm. input (A31-B31) to mon. output (C16-C17)	: 32 ± 0,5 dB
Gain freq. response (rel. 500 Hz)	: 150 Hz, -3,5 dB ± 1 dB 12,5 Hz, 0 dB ± 0,5 dB
Eq. noise input voltage (C18-C19)	: < -109 dB (A)
Distortion V_o = +22 dB	: < 0,2%
V_o max. (d = 5%, f = 500 Hz)	: > +24,5 dB

LBB 3221/00 - 6-channel interpreter desk

1. General

This desk provides the speak and listening facilities for interpreters using the CCS400 system. Systems with up to 8 channels (including floor and autofloor channel) can be built with it.

2. Controls and indicators

- 6 locked push buttons
- 1-non-locked push button
- 1 three-position tumbler switch
- 1 two-position tumbler switch
- 1 8-position rotary switch
- 1 volume control
- 1 tone control
- 1 6-position rotary switch (rear side)
- 1 2-position slide switch (rear side)

3. Interconnection facilities

- A cable (l = 180 cm) with 25-pole male lockable D-connector for connection to the C.S.U. LBB 3300.
- A 25-pole female D-connection to connect to the next LBB 3221.
- A 6,3 mm jack for the connection of a microphone.
- A 6,3 mm jack for the connection of a headphone.

4. Electrical specification

1. General

Supply voltage	: 24 - 27 V
Supply (stand by) current	: typ. 42 mA, max. --- mA.

2. Microphone channel

Frequency range	: 150 Hz - 12,5 kHz
Input level microphone	: nom. 85 dB SPL max. 110 dB SPL
Equiv. noise input level	: < 35 dB (A) SPL, typ. 32dB(A)
Output impedance	: 1250 E ± 15%
Load impedance	: 200 E with center tap biased to 13.5 V with 3 K series-resistor
Output voltage	: nom. -4 dB ± 1 dB max. -3 dB ± 1 dB

3. External microphone input :

Input impedance	: > 90 K
Nominal input level	: -36,5 ± 4 dB (dependant of the setting of R4)
Gain frequency response	: 40 Hz-14 ± 3 dB
(rel. 500 Hz)	: 150 Hz-1.5 ± 1 dB 12,5 Hz-0,75 ± 1 dB
Distortion at input level	: < 0,2% (nominal +25 dB).

When the microphone is switched off then the selected channel automatically receives the floor language.

4. Floor relay amplifier

Input impedance (X1-1 --- X1-14)	: 24 K ± 5%
Gain	: -5 ± 1 dB
Gain freq. response (rel. 500 Hz)	: 150 Hz -1,5 ± 0,5 dB

5. Headphone amplifier

Input impedance	: > 5 K
Output impedance	: 500 E ± 5%
Gain (volume control max., pres. control min., unloaded)	: 31,75 ± 1 dB
Eq. noise input voltage	: < -99 dB(A) (R_S = 200 E)
Distortion V_o + 10 dB	: < 0,5% (RL = 150 E)
Presence frequency	: 4000 Hz ± 400 Hz
Extra gain at pres. freq.	: > 8 dB

System electro acoustical characteristics

If no tolerances are stated than the values are indicative.

Automatic microphone switch off circuitry	
attack level	: 64 dB SPL ± 3 dB
for one additional nominal speaker (85 dB SPL)	: < 80 dB(A) SPL
time delay for each speaker	: 40 ± 20 seconds
Automatic gain reduction	
for two or more microphones on	: -3 dB ± 1 dB
Power consumption passive delegate unit T.T.	: 8 mA typ.
L.S. active delegate unit T.T.	: = 11 mA
Micr. on delegate unit T.T.	: = 30 mA

Proporties of transmission links

In- and output levels are indicated in dB S.P.L. or dB rel. 0,775 V (unloaded). Output levels of loudspeakers are indicated at 0,5 m. distance.

Interface data

	Link A-C	A-E	A-G	A-D	A-H
Nominal input level	<----------All links 85 ---------->				
Overload input level (500 Hz)	<----------All links 110---------->				
Output impedance	70..700E	N.A.	<1K	<10E	<200E
Permissible load impedance	>10K	N.A.	>10K	=>150E	>1K
Output level (input level between nom. and overload) (central gain pot. -3dB)	-9..+1	+75..+85	+5..+15	+11..+20	-4..+6

Transfer data

Gain reduction at O.I.L. (A.G.C.)	<----------All links 16 dB ± 1 dB---->				
Gain reduction no microphone on	<---------- 0 dB ---------->				
Gain reduction, 2 or more microphones on	<------All links 3 dB ± 0,5 dB->				0 dB
Range of attenuator for del. loudsp./headph. (± 1 dB	<--------0, -3, -6, -12, -15--->				0 dB
Distortion at rated imp.	<1%	<3%	<1%	<1%	<1%
Distortion at max. imp.	<5%	<5%	<5%	<5%	<5%
Typical clipping level (distortion = 5%)	-	-	-	+11 dB	-
Eq. noise input level (A-weighted): typical:	<32	<32	<32	<32	<32

Interface data

	Link A-I	A-L	A-J
Nominal input level	---------->		
Overload input level (500Hz)	---------->		
Output impedance	<50E	510E/220K	<5E
Permissible load impedance	>1K	>0E	<50E
Output level	-16..-6	-24	+25...+30
(input level between nom.	- 4..+6		
and overload)	+ 6..+16		
(Central gain pot. -3dB)			

Transfer data

Gain reduction at O.I.L. (A.G.C.)	---------->		
Gain reduction no microphone on	---------->		
Gain reduction, 2 or more microphones on	0 dB	0 dB	0 dB
Range of attenuator for del. loudsp./headph. (± 1 dB)	0 dB	0 dB	0 dB
Distortion at rated imp.	<1%	<1%	<15%
Distortion at max. imp.	<5%	<5%	<30%
Typical clipping level (distortion = 5%)	-	-	+24,5
Eq. noise input level (A-weighted): typical:	<32	<32	<32

Interface data

	Link C-H	F-H	I-E	C-E
Nominal input level	0,41 mA	-4 dB and +6dB	-16,-4,+6dB	-4 dB
Overload input level (500 Hz)	1,3 mA	+6 dB and +16dB	-6,+6,+16dB	+6 dB
Input impedance	70-700E	>10K	71K,24K,6K	>30K
Output impedance	<200E	<200E	N.A.	N.A.
Permissible load impedance	>1K	>1K	N.A.	N.A.
Output level	-4..+6	-4..+6	+75..+85	+75..+85
(input level between nom. and overload)				
(Central gain pot -3dB)				

Transfer data

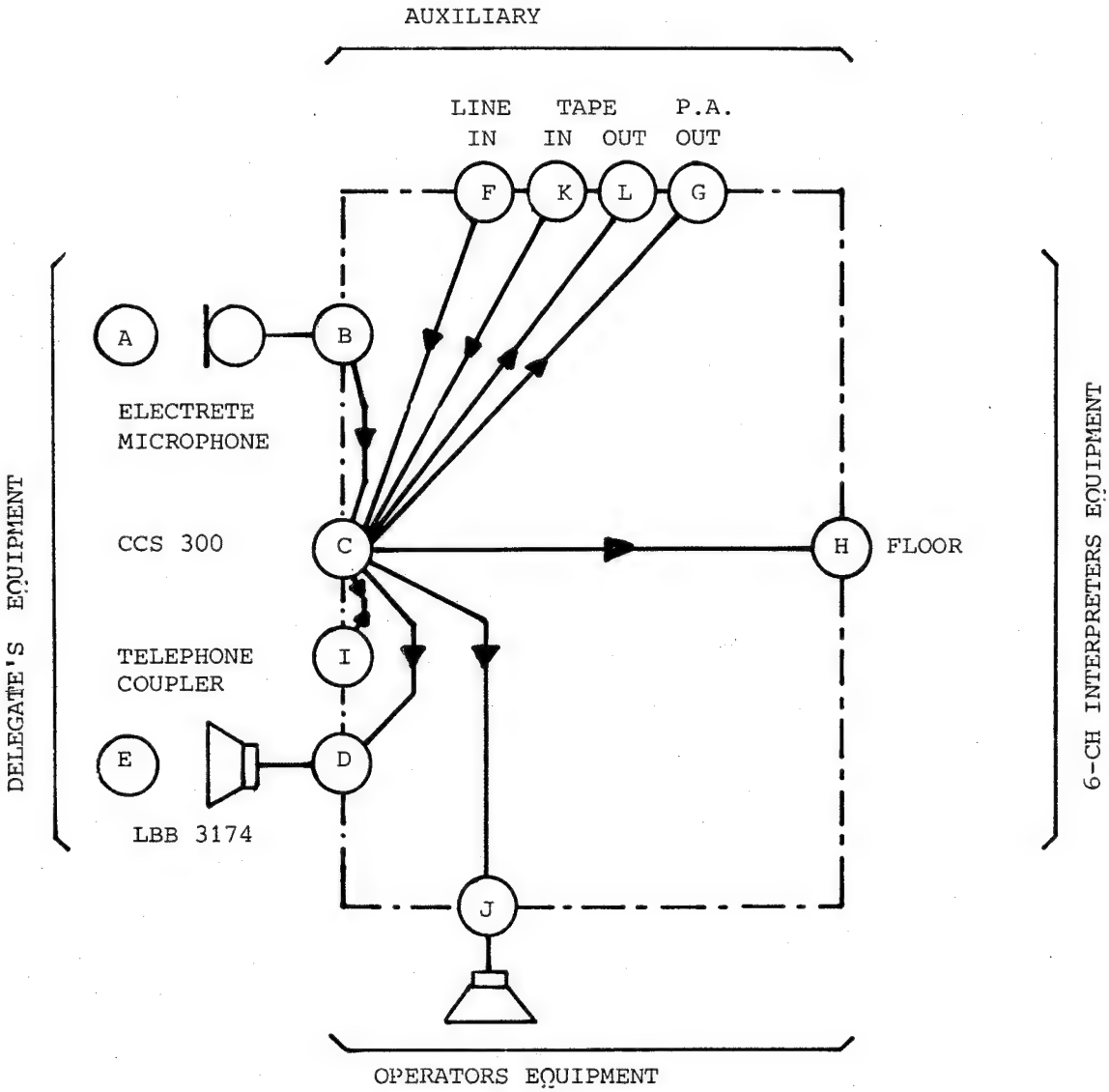
Gain reduction no microphone on	<----- 0 dB ---------->			
Gain reduction, 2 or more microphones on	<----- 3 ± 1 ---------->			
Range of attenuator for del. loudsp./headph.	0,-3,-6,-9,-12,-15		<3%	<3%
Distortion at rated imp.	<0.5%	<1%	<5%	<5%
Distortion at max. imp.	<2%	<5%	-	-
Typical clipping level (distortion = 5%)	+15dB	+9 dB		
Eq. noise input level (A-weighted, 1 micr. on)	<0.41uA	<-64		

Limits of the system

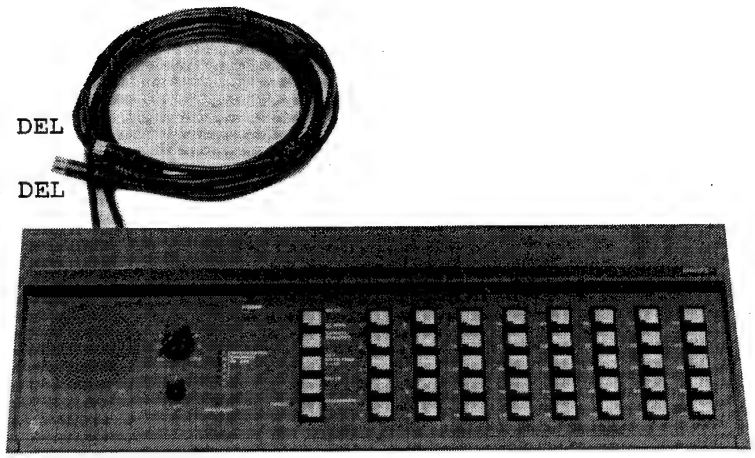
One LBB 3300/00 can feed two loop-through strings of 35 * delegate units with max. 50 meters extension cable each. In case of trunk cabling, the maximum length of each string is 100 meters (power core Ø 0,75 mm^2).

Max. number of 6 channel interpreter desks LBB 3221 is 18 *.
Max. number of channel selectors LBB 3178 is 1000.

* Max. total continuous current $\leq$ 1,7 A (two strings and interpreters desks), and $\leq$ 1,55 Amp when LBB 3203 feeds 1000 channel selectors.


AUXILIARY
LINE IN
TAPE IN
TAPE OUT
P.A. OUT
F
K
L
G
A
B
ELECTRETE MICROPHONE
CCS 300
C
H
FLOOR
TELEPHONE COUPLER
I
E
D
LBB 3174
J
DELEGATE'S EQUIPMENT
6-CH INTERPRETERS EQUIPMENT
OPERATORS EQUIPMENT

LBB 3386/40	CENTRAL CONTROL DESK, 40 DEL
LBB 3386/70	CENTRAL CONTROL DESK, 70 DEL
LBB 3386/01	CENTRAL CONTROL KIT, BASIC PCB ASSEMBLY
LBB 3386/02	CENTRAL CONTROL KIT, EXTENSION PCB ASSEMBLY



CAUTION FOR PREVENTING DIGITAL CIRCUITRY DAMAGE, USE DURING TESTING ONLY MEASURING EQUIPMENT WHICH IS NOT EARTHED !

CONTENTS PAGE NO

1 INTRODUCTION AND TYPENUMBERS

1.1 INTRODUCTION

In this document the CCS 400 Central Control equipment is described. The service policy is to maintain and repair this equipment at the customers site (mainly first line). Therefore the complete PCB assemblies, cable assemblies and mechanical assemblies are stocked as spare parts at concern service.

1.1.1 The Central Control Desk

The central control desk provides complete control over the CCS400 conference system. The desk gives the operator the means to control the on/off status of the delegates microphone units and to monitor the systems audio channels. It also provides an over-all view of the system status, including a request-to- speak list, active microphones and microphones to which a special status (AUTO-FREE) has been assigned, plus a facility for monitoring the interpretation channels.

Two desks are available, one for control up to 40 delegates, the LBB 3386/40, and the other for control up to 70 delegates, the LBB 3386/70. The LBB 3386/40 consists of one uP/switch board and one I/O/switch board. The LBB 3386/70 consists of one uP/switch board and two I/O/switch boards.

The desk includes 40 or 70 illuminated microphone control keys, each key corresponding to a single delegates microphone unit. A facility is also provided were up to a maximum of 5 delegates units out of 10 may be assigned with a special status (AUTO-FREE). The delegate units assigned with the special status allow their users to switch on or off their microphone units without any intervention by the system operator during conference proceeding.

The control desk provides two operational modes :

1) Automatic mode (AUTO)
Delegates may control the on/off status of their own microphones

2) Manual mode (MANUAL)
Delegates initially join a queue of waiting delegates who have requested to speak. Once in the queue the operator has full control over the on/off status of the microphone units.

For further functional description see "Discussion Conference and Interpretation system CCS400 Installation Manual and Operating Instructions for the Conference Application", 3922 988 20211.

1.1.2 The Central Control Kit

The central control kit has been designed and assembled for customers wishing to create and design their own custom built control desk. The kit provides complete control of the CCS 400 conference system for up to 10, 40, 70 or 100 delegate units.

The installation kit provides the means to arrange and position the control switches, used to control the delegates microphone units, and their respective led indications to any desired location on the custom built control desk. For example the geographic positions of the delegates microphone units in a conference hall may be represented on the control desk.

The central control kit is made up of two main PCB board assemblies :

- LBB 3386/01 basic PCB assembly
- LBB 3386/02 extension PCB assembly

The basic PCB assembly LBB 3386/01 allows control up to 10 delegates units, together with facilities for system monitoring and microphone management. An extension to the basic PCB assembly is provided by the extension PCB assembly LBB 3386/02 capable of controlling up to a further 30 delegate units.

The following configurations can be made :

configuration 1 : 1 x LBB 3386/01 provides central control for up to 10 del. units.

configuration 2 : 1 x LBB 3386/01 and 1 x LBB 3386/02 provide central control for up to 40 del. units.

configuration 3 : 1 x LBB 3386/01 and 2 x LBB 3386/02 provide central control for up to 70 del. units.

configuration 4 : 1 x LBB 3386/01 and 3 x LBB 3386/02 provide central control for up to 100 del. units.

NOTE This is the maximum configuration which is possible with the kit. This "maximum" is mainly determined by the software.

The basic PCB assembly LBB 3386/01 consist amongst others of an assembled microprocessor/switch PCB. This PCB is functionally and electrically similar to the uP/switch board of the LBB 3386/40/70 (description in chapter 4 and 5) with the exception of the leds and pushbuttons. Where on the uP/switch board of the /40/70 the leds and buttons are mounted, connectors are placed on the /01 board to make it possible to connect leds and buttons at remote positions for special applications. The extension PCB assembly LBB 3386/02 consist amongst others of an assembled switch PCB. This PCB is similar to the I/O/switch board of the LBB 3386/40/70

(description in chapter 4 and 5), functionally as well electrically. As on the uP/switch board of the /01, the leds and pushbuttons are replaced by connectors.

For description of how to use the installation kit, see installation manual 3922 988 20111.

1.2 TYPENUMBERS

LBB 3386/40 Central Control Desk for up to 40 del. units

LBB 3386/70 Central Control Desk for up to 70 del. units

LBB 3386/01 Basic PCB assembly of central control kit

This assembly consists of the following :

- 1 x assembled microprocessor/switch board
- 2 x cable relief grommet
- 2 x trunk line
- 1 x headphone socket and nut
- 1 x loudspeaker and mounting plate
- 1 x 8-pole rotary switch (monitor)
- 2 x knob + cap
- 1 x potentiometer 47 Kohms
-12 x cable (4 core) with 4-pole connector for switch (push button) and led
-19 x cable (2 core) with 2-pole connector for led
- 3 x cable (2 core) with 2-pole connector for switch (push button)
- 1 x cable (11 core) with connector for monitoring interpretations
- 1 x cable (2 core) with connector for loudspeaker connection

LBB3386/02 Extension PCB assembly of central control kit.

This assembly consists of the following :

- 1 x assembled switch board
-30 x cable (4 core) with 4-pole connector for switch (push button) and led

2 TECHNICAL DATA

The functional specification/description can be found in the CCS400 Installation manual 3922 988 20211.

NOTE Where "see spec. section13" is mentioned, the electrical specification, which is included in section 13, is meant.

2.1 GENERAL TECHNICAL SPECIFICATION

2.1.1 6.3mm Socket For Headphone

Output level at nominal input level (85 dB S.P.L. at system microphones) : > +22 dB (electrical)
(at least 22 dB with rotary volume control at minimum)

Output impedance : 680 Ohm.

2.1.2 Monitor Part

Monitor amplifier :

frequency response : 150 Hz - 12,5 KHz

Monitor loudspeaker :

Output level at nominal input level (85 dB S.P.L. at system microphones) : > 80 dB S.P.L., at 0,5m !!

Total Harmonic Distorsion : < 2%

2.1.3 Rotary Volume Control For Loudspeaker/Headphone Level

adjustment range : 27 dB (electrical)

2.1.4 Mute Function

attenuation when mute is active : > 20 dB

2.1.5 Battery Back Up

data retention time at least 500 hours. (battery completely charged).

2.1.6 Checksum Of EPROM

The checksum of the EPROM is 3CC5.

2.1.7 Response Time at desk actions in the CCS400 system is < 0,33 sec.

2.2 INTERFACE SPECIFICATION

2.2.1 8-poleDIN connector for connection to DEL1 socket on C.S.U. (in circuit diagram ST1).

contact	function	specification
1,2,3,4,5,6	N.C.	
7	V+ del. units	see spec. section13
8	ground del. units	see spec. section13

2.2.2 8-pole DIN connector for connection to DEL2 socket on C.S.U. (in circuit diagram ST2).

contact	function	specification
1	Priority output	no priority : < 0,1mA priority : > 0,5mA
2	N.C.	
3	Audio (floor)	see spec. section13
4	Audio ground ("Auto switch off"	see spec. section13 on/off)
5	V+ for control desk	see spec. section13
6	N.C.	
7	V+ del. units	see spec. section13
8	ground del. units	see spec. section13

2.2.3 8-pole female DIN sockets BU1 & BU2

For connection of Del string1 respectively Del string2

contact	function	specification
1	Priority output	no priority : V > 20V priority (AUTO and MANUAL) : 9V < V < 14V
2	Disable request output	Disable : V < 9V Enable : V > 11V
3	Audio (floor)	see spec. section13
4	Audio ground ("Auto switch off"	see spec. section13 on/off)
5,6	N.C.	
7	V+ del. units	see spec. section13
8	ground del. units	see spec. section13

2.2.4 8-pole female DIN socket BU3

For connection of chairmans unit

contact	function	specification
1	Priority input	priority : V < 3,5V non-priority : floating
2,5	N.C.	
3	Audio (floor)	see spec. section13
4	Audio ground	see spec. section13
6	Remote control	mic. off : V= 15V +/- 1V mic. on : V= 5,5V +/- 1V

7	V+ del. units	see spec. section1
8	ground del. units	see spec. section13

2.2.5 6-pole female DIN socket BU4

For connection of external power supply unit (if required)

NOTE This "extra" power is only used by the central control desk hardware and not by the connected delegate units.

contact	function	specification
1,3	ground	
2	V+ input	28V +/- 1V continuous outp. current > or equal to 0,3A continuous short circuit current < or equal to 0,5A
4,5,6	N.C.	

2.2.6 15-pole female D-type connector socket BU6

For connection of the C.S.U.- or transmitter- monitor socket
A monitor cable LBB 3024/02 must be used between BU6 and C.S.U. or transmitter.

contact	function	specification
1,9	Monitor signal input	see spec. section13
2	led input ch6	current 2,5 mA +/- 10%
3	led input ch4	" " " " " "
4	led input ch2	" " " " " "
10	led input ch3	" " " " " "
11	led input ch5	" " " " " "
12	led input ch1	" " " " " "
5,6	common led input	ground
7	output A1	logical 0 : floating logical 1 : 5V
8	output A3	connected to pin 13 (5V)
14	output A0	see 7
15	output A2	see 7
13	common input	+5V

2.2.7 25-pole female D-type connector sockets BU7 (del. 1-10), BU1 (del. 11-20), BU2 (del. 21-30), BU3 (del. 31-40), BU1 (del. 41- 50), BU2 (del. 51-60), BU3 (del. 61-70), BU1 (del. 71-80), BU2 (del. 81-90) and BU3 (del. 91-100). BU1, BU2 and BU3 are mounted on the I/O switch board. (1 x in /40, 2 x in /70, 1,2 or 3 x as /02 in central control kit).

For connection of the delegate units for remote control

remote control input pins	:	input impedance	: > 30K
		input floating	: no request
		input < 5V	: request
remote control output pins	:	pulse amplitude	: 24 V +/- 2V

rise time (del. on): < 0,5 m
fall time (del.off): < 0,5 ms
maximum load : 12 nF

Input/output pins off connected delegates	IN pin	OUT pin
1, 11, 21, 31, 41, 51, 61, 71, 81, 91	5	17
2, 12, 22, 32, 42, 52, 62, 72, 82, 92	4	18
3, 13, 23, 33, 43, 53, 63, 73, 83, 93	3	15
4, 14, 24, 34, 44, 54, 64, 74, 84, 94	2	16
5, 15, 25, 35, 45, 55, 65, 75, 85, 95	1	14
6, 16, 26, 36, 46, 56, 66, 76, 86, 96	10	23
7, 17, 27, 37, 47, 57, 67, 77, 87, 97	9	21
8, 18, 28, 38, 48, 58, 68, 78, 88, 98	8	22
9, 19, 29, 39, 49, 59, 69, 79, 89, 99	7	19
10,20, 30, 40, 50, 60, 70, 80, 90, 100	6	20

2.3 SYSTEM CONDITIONS

2.3.1 Working Conditions

- fixed/stationary/transportable
- indoor use
- operation by experts/laymen
- climate : +5/+40 C

2.3.2 Storage And Transport

- packed according to UND 1400
- transport conditions : -40/+70 C

2.3.3 Safety Requirements

- IEC 65, SEMCO, DEMCO, NEMCO, BS415

2.3.4 Interference

- The radiation according to CISPR catagory II
- The susceptibility for mains interference :
  the equipment can be used in industrial areas.
- The susceptibility for electromagnetic interference :
  a field of 1V/m, 30 % modulation (AM), frequency between 0-500 Hz, gives an interference of < 40 dB related to the nominal output level.
- The susceptibility for static discharges on all touchable partson the outside of the equipment does not cause any damage of parts or non-self-resetting disturbing functions.

2.3.5 Other Legal Requirements

- cadmium is not present in components or as metal protection.

2.4 QUALITY/RELIABILITY SPECIFICATION

2.4.1 Technical Lifetime

- The total lifetime required is > 7 years.

2.4.2 Reliability

- Mean Time Between Failures (M.T.B.F.) : 50.000 Hrs
- Mean Time To Repair (M.T.T.R.) : 30 min. 1st line
  90 min. 2nd line

2.5 QUALITY TESTS

2.5.1 Temperature

- operating :
  - dry heat acc. to IEC 68-2-2B, +45 C
  - dry cold acc. to IEC 68-2-1A, +5 C
    at these temperatures the products will fulfill the specification data.

- storage and transport :
  - test acc. to IEC 68-2-1A and 96 hours at +70 C acc. to IEC 68-2-2B.

2.5.2 Relative Humidity

- cyclic damp heat test acc. to IEC 68-2-30Db; 21 days in 40 C

2.5.3 Bump

- Test acc. to IEC 68-2-29Eb; 3 directions,
  1000 bumps of each 10g (gravity).

2.5.4 Vibration

- tested acc. to IEC 68-2-6Fc, procedure A;
  1) vibration between 10 and 60 Hz, vibration amplitude 0,35mm, gravitational force variable.
  2) vibration between 60 and 150 Hz, gravitational force 5g, vibration amplitude constant.

tests in 3 directions, 30 min/direction (without resonance test)

2.5.5 Transport

- droptest acc. to UND 1400 with packed product.

2.5.6 Susceptibility To HF (see 2.3.4)

- tested acc. to ELV 14-204

2.5.7 Conducted And Radiated Interference

- acc. to CENELEC/CISPR, catagory II

2.5.8 Spikes On The Mains

- tested with Koepfer generator SG242
  400V spikes will give no noticeable disturbance.
  800V spikes will not cause defects.

2.5.9 Safety

- safety acc. to IEC 65

3 TEST INSTRUCTIONS

The following test instructions are to test the central control equipment functionally. For composing a CSS 400 conference system (this also includes central control equipment) see installation manual 3922 988 20211. This chapter is referred to in chapter 5 of the above mentioned installation manual.

1) Switch on the mains supply on the Central Supply Unit (C.S.U.)

2) Check that the "mains on" indicator on the central control desk is illuminated.

3) Adjust the monitor gain control on the control desk to the required listening level.

4) Put the control desk into the "MANUAL" mode, i.e. press the key marked "AUTO MAN" until it illuminates.

5) Press in chronological order the microphone on/off buttons of the delegate units assigned with numbers 1-10. Check that the green LED on the units illuminate.

6) At the control desk the illuminated keys corresponding to the first ten delegate units 1-10 should now be illuminated and flashing. The key marked no.1 which corresponds to the delegate unit assigned no.1 should now be flashing at twice the speed of the other keys marked 2-10.

7) At the control desk press the corresponding illuminated keys to switch on the microphones of the delegate units 1-10.

   NOTE At this stage it is assumed that no "AUTO FREE" status has yet been assigned. Therefore the first seven microphones (the CCS 400 system is limited to 7 active microphones plus the chairmans microphone) should now be activated.

8) After pressing the illuminated keys 1-10 on the control desk, check that the delegate unit microphones 1-7 are active and their corresponding red leds on the unit themselves are illuminated and the corresponding keys on the control desk are now permanently illuminated.
   Check that the loudspeakers of the corresponding units are switched off.
   If necessary adjust the system gain to the required listening level free from acoustic feedback, by means of the rotary switch on the C.S.U.

9) The "MIC. LIMIT" led on the control desk should now be illuminated indicating that the limit of the system has now been reached. In such a case it will be unable to switch on any more microphones.

10) Switch off the active delegate microphone units either by pressing again the corre ›onding keys on the control desk, or by pressing again the microphone on/off button on the microphone units themselves.

11) At the control desk the keys marked 8,9 and 10 should still be illuminated and flashing.
Key eight should be flashing at twice the speed of keys 9 and 10.

12) At the control desk press the corresponding illuminated keys to switch on the microphones of the delegate units 8,9 and 10. Check the units for correct operation as above.

13) Depending on the number of delegate units installed in the system repeat steps 5 to 12 for delegate units numbered 11-20, 21-30, 31-40, etc to 91-100.

14) Check the "CANCEL REQUEST" function on the control desk by first making a number of requests to speak by pressing the microphone on/off buttons on the delegate units.
The keys corresponding to the delegate units on the control desk which have requested to speak will now be flashing. Press the key marked "CANCEL REQUEST" on the control desk, this should now extinguish all the illuminated flashing keys together with the green leds on the corresponding delegate units.

15) To check the chairmans unit, press the key marked "CHAIRMAN" on the control desk to switch on the chairmans microphone. The key will illuminate together with the red led on the chairmans unit. To switch off the chairmans unit, press again the key marked "CHAIRMAN". The illuminated key will now extinguish together with the red led on the unit itself.

16) To check the chairmans priority function, keep the key marked "PRIORITY" on the chairmans unit pressed. A chime tone should be heard, and the led marked "PRIOR" on the control desk should illuminate and the chairmans microphone should now become active, and all active microphones become temporarily muted.

17) When the "PRIORITY" key is released the microphones which were temporarily muted, should now become active again. The red led marked "PRIOR" will extinguish.

18) To check the mute function, activate a number of delegate units and press the key marked "MUTE" on the control desk. When pressed the floor distribution should now be muted.

19) To check the "AUTO FREE" status assign the delegate units numbered 1-5 with the auto free status. This is achieved by keeping the key marked "SET AUTO FREE 1-10" on the control

desk pressed, while selecting keys 1 to 5. When selected the corresponding green leds will illuminate.

20) When selected for "AUTO FREE" status, the assigned units may be switched on or off at any time by pressing the units microphone on/off buttons. However the assigned units may also be switched on or off at the control desk. Check this function.

21) Repeat steps 19 and 20 for delegate units 6 to 10.

22) To check the system in the "AUTO" mode, press the key marked "AUTO MAN" on the control desk, until the illuminated key extinguishes. In the "AUTO" mode delegates control their own microphones.
However, as previously stated, the CCS 400 system is limited to 7 active microphones plus the chairmans microphone. Press the on/off button of the delegate units numbered 1-7, they should now become active automatically until the MIC. LIMIT led illuminates. Check that after a repeat operation of the units on/off buttons the units are now switched off.

4 BLOCK DIAGRAM DESCRIPTION

The central control desk can be divided into 15 parts (see block diagrams fig. 1,2,3 and 4). These 15 parts are divided over 2 main PCB's, the uP/switch board 3922 156 06560 (in control desk) or /01 (in control kit) and the I/O/switch board 3922 156 06550 (in control desk) or /02 (in control kit).

4.1 PART 1 MICROPROCESSOR Z80

The Z80 uP controls the data uplink and data downlink part. It ensures that the leds of the desk buttons are switched on or off via the data downlink part at the correct time. The processor also provides data to switch on or off the delegate and chairman microphones. Via the uplink part requests from delegates and information from the desk buttons are read in by the processor. Via the address bus the RAM and ROM can be addressed. Via the data bus, data is send to the RAM, the UART or to the data downlink converter. Data can be read in from the RAM, ROM, UART, the address latch and the data uplink converter.

4.2 PART 2 CLOCK GENERATOR

The Clock generator part provides the uP clock and a serial and latch clock to control the data downlink and data uplink part. From the serial clock a CLK1 and CLK2 signal is derived to control the I/O part.

4.3 PART 3 POWER SENSE AND RESET CIRCUIT

This circuit senses the power supply voltage. When the system is switched on, a reset to the uP, RAM and IC18 (latch) will be generated. The circuit also contains a watchdog timer. This timer will reset the processor, RAM and IC18 in case the uP has "hung up" The watchdog reset circuitry can be made inactive by placing jumper S21.

4.4 PART 4 DATA UPLINK AND DATA DOWNLINK CONVERTER

The data downlink converter converts the parallel data from the uP into serial data for the I/O part to be sent to the delegate units to control the microphones, and to the desk button circuitry to control the leds. The data uplink converter converts the serial data, coming from the desk buttons and delegate requests via the I/O part, into parallel data for the uP.

4.5 PART 5 CONTROL CIRCUITRY

This part controls the memory (RAM & ROM), the UART, the reset circuit and finally the data uplink- and data downlink converters. It also provides load and strobe pulses for the I/O part.

4.6 PART 6 MEMORY

The ROM contains the uP program. The RAM contains program variables and is used to store temporary data. The RAM has a battery back-up.

4.7 PART 7 SERIAL INTERFACE

NOTE This is an optional circuit.

This circuit contains an UART for serial communication with e.g. a Personal Computer.

4.8 PART 8 DATA DOWNLINK FOR DESK BUTTON LEDS

In this part serial data from the data downlink converter is converted into data to control the desk button leds. The circuit is controlled by CLK1 and STROBE1.

4.9 PART 9 DATA UPLINK FOR DESK BUTTON INFORMATION

In this part data from the desk buttons is converted into serial data for the data uplink converter. The circuit is controlled by CLK2 and inverted LOAD1.

4.10 PART 10 DATA UPLINK FOR DELEGATE REQUEST INFORMATION

In this part data from the delegate request buttons is conver- ted into serial data for the data uplink converter. The circuit is controlled by CLK2 and inverted LOAD2.

4.11 PART 11 DATA DOWNLINK FOR DELEGATE MICROPHONES

In this part serial data from the data downlink converter is converted into data to control the delegate microphones. The circuit is controlled by CLK1 and STROBE2.

4.12 PART 12 PRIORITY/DISABLE REQUEST CONTROL CIRCUIT

Via this circuit the priority signal from the chairman is connected to the data uplink circuitry in part 10. A priority signal, to activate the chime tone, which is coming from part 11, is distributed to the delegates and the Central Supply Unit. Disable request, activated by part 11, is connected to the delegates.

4.13 PART 13 CHANNEL MONITORING

In this circuit the monitor signal or the floor is selected via a multiplexer. Via this part the channel address selected by the channel selector is routed to the M.D.B. (Monitor Distribution Board) or transmitter via BU6. The selected channel is received as the monitor signal. Volume control is provided by a potentiometer which can be controlled at the front of the desk.

4.14 PART 14 VOLTAGE CONVERTER

In this part several voltages used in the circuitry, are derived from the power supply voltage coming from the Central Supply Unit and/or the external supply unit. A rechargeable battery ensures Vbat. for e.g. the RAM when the system is switched off or in case of a power failure.

4.15 PART 15 CHANNEL OCCUPIED INDICATION

This circuit ensures that a led will illuminate when the corresponding channel is occupied. The channel occupied information, available on BU6, is taken from the Monitor connector at the Central Supply Unit or at the IR transmitter.

5 CIRCUIT DESCRIPTION

5.1 AUDIO PART

This part is located on the uP/switch board 3922 156 06560 (in control desk) or on /01 (control kit)

See circuit diagram fig. 6

5.1.1 Power Supply

Via pin 3 and pin 4 of DELII (ST2) the floor line from the C.S.U. (Central Supply Unit, LBB 3300/--) is connected to the Chairmans connector (BU3-3,4), to delegate string 1 (BU1-3,4) and to delegate string 2 (BU2-3,4). The power supply voltage coming from the C.S.U. via ST2-7,8 and ST1-7,8 is used by the chairman (BU3-7,8) and delegate string 2 (BU2-7,8) respectively by delegate string 1 (BU1-7,8). The voltage y-z is made from the power supply voltage from DELII (ST2) and/or from the voltage coming from an external power supply. Y is 26,5 V and Z is earth (mechanical ground). From this voltage y-z, the voltage Vdd is derived, with Vss as ground reference. Vdd is used for all digital IC's.

NOTE Vdd is 26,5 V in relation to earth (mechanical ground). Vss is approx. 21 V in relation to earth. This means that Vss is not mechanical ground but a ground reference for the digital circuitry. When using measuring equipment which is earthed, it is possible that 26,5 V will be present at the digital circuitry. Therefore :

CAUTION For preventing digital circuitry damage, use during testing only measuring equipment which is not earthed.

The resistor circuitry R164-R168 divides the power voltage coming from ST2-8 or from the external power supply, into the following voltages, V++, +13V, +5V and +2,5V. These voltages are used in the monitor part (circuitry around IC31 and IC32).

5.1.2 Monitoring

The circuitry around and including IC31 ensures that the monitored channel (coming from the M.D.B. in the C.S.U., or from an IR transmitter) or the floor is switched to the loudspeaker amplifier. When via the monitor cable a M.D.B. or IR transmitter is connected, 5V is supplied to the select inputs of the mux. IC31. By means of the channel selector any channel including floor and autofloor can be monitored. When no M.D.B. or IR transmitter is used monitoring of the channels is not possible. The select inputs of the mux. are now low and therefore the floor is always switched through independent of the channel selector position.

5.1.3 Channel Occupied Indication

On BU6-2,3,4,10,11 and 12 the channel occupied information for the leds, coming from the int/mon board in the C.S.U. (directly or indirectly via a connected IR transmitter), is available. The channel occupied leds are connected between the info pins on the connector BU6 and the ground reference pin BU6-6. When a channel is occupied the corresponding op-amp on the int/mon board will have an high output of 27V ensuring that current can flow through the led to ground. The led will illuminate.

5.1.4 Loudspeaker/Headphone Amplifier

The op-amp IC32 together with TS11, TS12, TS13 and TS14 and surrounding components form the power amplifier for the loudspeaker and headphone. Volume control is possible with the 47K potmeter connected to X4-2,3. The loudspeaker will be switched off when a headphone is plugged in. IC32 is amplifying the signal and the resistors and capacitors determine the amplification rate and the bandwith. The transistors TS11, TS12, TS13 and TS14 provide enough current to drive the loudspeaker.

Switch button S2 can be used for muting the floor signal.

5.2 MICROCOMPUTER PART

his part is located on the uP/switch board 3922 156 06560 (in control desk) or on /01 (control kit).

See circuit diagrams fig. 7-1 through 7-4 and fig. 11-1 through 11-4.

The microcomputer part roughly consist of the Z80 uP, RAM, ROM, control circuitry and an optional serial interface part for e.g. PC connection.

5.2.1 Reset Circuitry

5.2.1.1 Power Sensing

The circuitry consisting of TS1, TS2, TS3 and associated components is sensing the voltage Vdd. As long as the power supply voltage is not in range, less than approx. 6V, the set (4) input of IC15a (emitter of TS3) is active low because Vdd is lower then 6V. The inverted Q output (6) is low and the uP, RAM and IC18 are in reset. The Q output (5) is high and no current can flow through D4 to ground, therefore the "power on" led will not be illuminated. When the power supply voltage is in range, greater than approx. 6V, the set input of IC15a becomes high and therefore inverted Q output is no longer low (uP, RAM and IC18 no longer in reset), but is dependent of the C1 (3) and 1D (2) inputs of IC15a. The Q output is high, current can flow through the "power on" led D4 to ground and the led will illuminate.

5.2.1.2 Watchdog timer.

When the power supply voltage is in range (>6V), the MR input 11 of counter IC14 is low via inverter IC13d. Normally pin3 of IC24a is high (not addressed by uP) and therefore pin6 of IC13C, which is connected with MR, is low. The counter is normally counting. The uP, which is running in normal situation, takes care that at regular intervals pin3 of IC24a is addressed, pin3 then becomes low Via pin6 of IC13c and C7 a positive pulse is generated at the MR input of IC14. The counter will be reset and starts counting the incoming clockpulses at pin10 again. The interval frequency is chosen so that the output 14 of IC14 never reaches the high state. Every time before output 14 of the counter will turn high (after 512 clockcycles), the counter will be resetted by the MR pulse. In this way output 14 will remain low as long as the uP generates via IC24a, pin3 and IC13c/C7 the MR pulse at the proper time. Pin 9 of the counter, which is connected with C1 input of IC15a, ensures that the low 1D input (output 14 of IC14) is clocked to the outputs. Q is low, led D4 will illuminate. Inverted Q output is high, the uP, RAM and IC18 are not in reset. When the uP has hung up itself pin3 of IC24a will not be addressed at the proper moment, via IC13c/C7 the MR input remains low. The counter will not be reset at the regular intervals and therefore it continues to count incoming clockpulses. Output 14, 1D input of IC15a, will become high (after 512 clockcycles) and therefore inverted output Q becomes low. The up, RAM and IC18 will be reset now.

5.2.2 Microprocessor

The reset output of the power sense/watchdog circuit is connected to the active low RESET input ensuring that, when the system is switched on, a powerfailure occurs or when the processor has hung up itself, the uP will be reset. A0/A15 of the Z80 form the address bus providing the addresses for the memory and I/O. D0/D7 forms the bidirectional data bus. The in- verted outputs M1, RFSH, HALT and BUSACK are not used. The inverted inputs WAIT and BUSREQ are also not used and therefore connected to Vdd. The inverted INT input is used by a clock signal coming from IC22 ensuring that the uP is interrupted at regular intervals. Every time the inverted INT is low the uP diverts to an interrupt program controlling the delegates and desk buttons/leds via the data uplink and data downlink converter. In the time between these interrupts, the processor is carrying out several other actions e.g. taking decisions wether to switch on or off a delegate microphone or a led, updating memory, etc. The inverted NMI input (Non Maskable Interrupt) is connected to the inverted transmitter/receiver ready/empty control output of the optional UART. The inverted outputs MREQ (memory request), IORQ (I/O request), RD (read) and WR (write) are used via IC16 to read/write the memory and I/O devices.

5.2.3 Clock Circuit

This circuit provides a 5.0688 MHz clock signal. IC22 provides clock signals CLK1/CLK2 (used by the data uplink/downlink parts) and a "divided by 8" clock signal (latch clock) to interrupt the uP via the inverted INT input. This latter clock signal is also used by the data uplink/downlink parts and in the circuitry containing IC18, 19 and 20 to provide the LOAD and STROBE pulses.

5.2.4 Read/Write, Enabling Circuitry

Via the OR-gates in IC16, read/write enable signals are composed from the inverted signals MREQ, IORQ, RD and WR, at output 11 "memory write" to put the RAM IC7 into the write mode (input enable), at output 3 the "memory read" signal for putting the RAM and/or ROM into the read mode (output enable). IC16-6 provides the I/O write signal and IC16-8 the I/O read signal. The I/O write and I/O read are used to enable respectively IC24a and IC24b. IC24a, using A4 and A5, ensures that IC18 or IC25 is clocked or the optional UART is enabled. Pin 7 of IC24a controls the watchdog timer circuitry. IC24b, using A4 and A5, provides the enable signal for IC17, IC26 or for the optional UART. The EPROM IC8 is enabled seperately by A15 which is connected to the Chip Enable input.

5.2.5 Memory

The memory consists of a 32Kbyte EPROM containing the uP program and a 8Kbyte RAM.

5.2.6 Optional Serial RS232 Interface

The PCB is prepared for placing an optional UART (IC27) and a buffer (IC28). With these two IC's a serial RS232 interface for connecting e.g. a PC is created. The EPROM must contain dedicated software, which is not standard available, ensuring that the Z80 uP can communicate with the UART.

5.2.7 DIL Switch S22

When the tranceiver IC26 is addressed the 8 switch positions of S22 can be read in by the microprocessor. In dedicated software this function will be used for special applications. E.g. when software is implemented to communicate with a PC via the UART, the baudrate of the communication can be adjusted by the DIL switch.

5.2.8 LOAD/STROBE Circuitry

From the latch clock made by IC22 and from the 4 data lines D0 through D3 the inverted LOAD and the STROBE pulses for the data uplink/downlink parts are composed. When IC18 is addressed (clocked) by IC24a pin6, the data inputs are switched to the outputs. From the two outputs IC18-3 and 6 the signals LOAD2, LOAD1 (both inverted), STR1 and STR2 are made via IC20 and IC19.

5.3 DATA UPLINK/DOWNLINK PART

This part is located both on the uP/switch board 3922 156 06560 (in control desk) or on /01 (control kit) and on the I/O/switch board 3922 156 06550 (in control desk) or on /02 (control kit).

See circuit diagrams fig. 7-1 through 7-4, fig. 9-1 through 9- 4, fig. 11-1 through 11-4 and fig. 13-1 through 13-4.

IC17 is the data uplink converter. It takes care that serial uplink data from the desk buttons ("B" in circuit diagram) or from the delegate request buttons ("C" in circuit diagram) is converted into parallel data for the uP. Serial data is clocked in by the serial clock CLK2, data is strobed into the parallel buffer of IC17 by the latch clock at the C2 input. IC25 is the data downlink converter. This IC ensures that the parallel data from the uP is converted into serial downlink data for desk leds ("A" in circuitdiagram) and for delegate mic. on/off switches ("I" in circuit diagram). Data is transferred from the parallel buffer into the shift register by the latch clock at the C2 input. The serial data is clocked out by the serial clock CLK1.

5.3.1 Data Uplink

The serial uplink data stream which is received by IC17 is composed of data representing the status of the desk buttons (B, DATA2 in circuit diagram) or data representing the status of the delegate mic. request buttons (C, DATA3 in the circuit diagram). When a desk button is pushed in, the voltage divider 10K/100K ensures that a voltage of approximately 4.5V (Vdd-Vss) is supplied as a logic "1" to the corresponding input of the parallel to series converters. When on a delegate unit a microphone request button is pressed current can flow from Vdd via the voltage divider 10K/33K to earth (mechanical ground) in the delegate unit. A voltage of approximately 0V (Vss ground reference) is supplied as a logic "0" to the corresponding input of the parallel to serial converters. The parallel status information is converted by IC9, IC10 and IC5 through IC8 (on I/O/switch board) for B, DATA2, and by IC11, IC12 and IC9 through IC12 (on I/O/switch board) for C, DATA3. The microprocessor determines which status data must be converted and finally read in via IC17. When, by dataline D1 via IC18, inverted LOAD1 is activated the status information of the deskbuttons is strobed into the parallel buffers. CLK2 ensures that the data is clocked out serially. When, by dataline D0 via IC18, inverted LOAD2 is activated the status information of the delegate mic. request buttons is strobed into the parallel buffers. The data is also clocked out serially by CLK2.

5.3.2 Data Downlink

The serial downlink data stream coming from IC25 is split into data for switching the desk leds on or off and data for switching on or off the delegate microphones. The serial data A, DATA1 is converted by IC1 through IC4 and IC1 through IC4 (on I/O/switch board). When a desk led must be switched on, the open collector output of the converter becomes low (Vss), current can flow from y (Vdd) via the corresponding led and the transistor in the convertor to ground reference (Vss). Serial data I, DATA4 is converted by IC29 ,IC30 and IC13 through IC16 (on the I/O/switch board). When a delegate units microphone must be switched on, the output of the converter becomes low (Vss). The output of the comperator LM324 becomes high (Vdd) with a risetime < 0,5 ms. The corresponding delegate units microphone will be switched on now (remote line becomes active high, Vdd). When a delegate units microphone must be switched off, the output of the converter becomes high (Vdd). The open collector output of the LM 324 becomes 0V (mechanical ground) in a fall off time < 0,5 ms. The switched on delegate microphone will be switched off.

Same as in the uplink part the microprocessor determines which serial data is converted. When, by D0 via IC18, STR1 is activated the serial data stream from IC25 (A,DATA1) will be clocked in serialy by CLK1 and strobed into the parallel buffers by STR1. When, by D1 via IC18, STR2 is activated the serial data stream from IC25 (I,DATA4) will be clocked in serially by CLK1 and strobed into the parallel buffers by STR2.

5.3.3 AUTO/MANUAL Mode

5.3.3.1 AUTO mode

In the AUTO mode two situations excist, x + y < or = 7 or x + y exceeds 7. X is the number of switched on microphones not having the AUTO FREE status (see 1.1.1) and Y is the number of delegates having the AUTO FREE status (see 1.1.1). When x + y < or = 7, the microphones of calling delegates (AUTO FREE and non AUTO FREE status) are switched on almost directly after the call. When the remote request line from a calling delegate becomes low it will be recognized by the uP (see data uplink 5.3.1). In the next data uplink/downlink cycle, the uP takes care that the particular delegate units microphone will be switched on via the remote line (see data downlink 5.3.2). When x + y exceeds 7, the incoming microphone calls of delegates, not having the AUTO FREE status, are treated as requests to speak, and placed in a wait queue. The uP takes care that after a request, the remote line remains low. The delegates microphone will not be switched on. Due to the low state of the remote line, the green request led in the delegate unit will illuminate (see description in section 2, delegate unit). The delegates having the AUTO FREE status are still able to switch on/off their microphones. When x + y becomes < or equal to 7, automaticly the uP takes care that the first delegate in the wait queue will be switched on (remote line becomes high).

When the operator decides to switch on or off a delegate units microphone (AUTO FREE and non AUTO FREE), he simply controls the particular button on the desk. When x + y exceeds 7, the operator is not able to switch on the delegate microphones, not having the AUTO FREE status, remotely. The AUTO FREE status delegates (Y) can be switched on/off remotely by the operator.

5.3.3.2 MANUAL mode

In the MANUAL mode all the microphone calls of delegates, not having the AUTO FREE status, are treated as requests. After a request, the uP takes care that the remote line to that particular delegate unit remains low. When the operator decides to switch on the microphone of the requesting delegate, he pushes the corresponding (flashing) deskbutton, the remote line will be switched high (see data downlink 5.3.2). The delegates microphone will be switched on, the green request led will be switched off in the delegate unit. All delegates having the AUTO FREE status are able to switch on/off their microphones by themselves.

When the operator decides to switch on or off a delegate units microphone (AUTO FREE and non AUTO FREE), he simply controls the particular button on the desk. When x + y exceeds 7, the operator is not able to switch on the delegate microphones, not having the AUTO FREE status, remotely. The AUTO FREE status delegates (Y) can be switched on/off remotely by the operator.

Via block 11 the chairman is switched on or off by the operator (via the chair desk button), or after a chairmans action (Priority or microphone call).

5.4 PRIORITY/DISABLE REQUEST CIRCUIT

This part is located on the uP/switch board 3922 156 06560 (in control desk) or on /01 (control kit).

See circuit diagrams fig. 7-1 through 7-4 and fig. 11-1 through 11-4.

5.4.1 Priority

When the chairman activates his priority it will be recognized by the processor via IC11, pin3. In the next uplink/downlink cycle pin 7 of IC29 is made high (Vdd) by the uP. Via block 12 this priority indication is send (DELII) to the C.S.U. (priority line becomes low, 0V mechanical ground) for activating the priority chime tone on the audio line. Pin 4 of IC29 becomes low (Vss) via the circuitry around and including TS5, the priority line, which is 27V (inactive) and connected via BU1-1 and BU2-1 to the delegate units, is pulled down to approx. 10V (spec. 9V < V < 14V). As described in chapter 2, this 10V (6V < V < 2/3 V+) ensures that the delegate microphones are muted during the priority. When priority is released by the chairman the remote

line becomes 27V again.

5.4.2 Disable Request

Both in AUTO mode as well in MANUAL mode a maximum of 20 microphone requests are registered in chronological order. When this number of requests is reached, the uP takes care that a "disable to request" is generated to all delegate units. Pin 5 of IC29 will be high (Vdd) in this situation, causing TS4 to conduct. The disable to request lines, BU1-2 and BU2-2, will be active high (Vdd). Microphone requests from the delegate will be ignored in the delegate unit as long as the disable request line is active. (see description in section 2, delegate unit).

6 PARTS LIST

6.1 LBB 3386/40/70

POSNR. :	DESCRIPTION :	SERVICE CODE :
	CABLE RELIEF GROMMET (cables del 1,11 to system PSU)	5322 325 50134
	CABLE ASSEMBLY (cables del 1,11 to system PSU)	5322 321 21658
	HEADPHONE JACK SOCKET	5322 267 40568
	RUBBER FOOT (bottom of desk)	5322 462 44375
	MONITOR LOUDSPEAKER AD3371/Y150	4822 240 30172
	POTENTIOMETER LOG. 47K (for volume control)	5322 101 20998
	COMPLETE SERVICE ASSEMBLY uP PCB	5322 214 90313
	COMPLETE SERVICE ASSEMBLY I/O PCB	5322 214 90314
	DUBOX SERVICE ASSEMBLY KIT (25 Crimp-to-wire contacts for use in DUBOX connectors)	5322 310 31241
	SWITCH MECHANISM (for switch on/off del remotely)	5322 278 14006
	KNOB WITH LENS (for switch mechanism)	5322 414 10011
	KNOB WITHOUT LENS (for switch mechanism)	5322 414 20059
	SHUNT 2p	5322 115 80116
	INSULATOR FOR IC5	5322 255 40792
	BATTERY 3,6V	4822 138 10046
	CRYSTAL 5,068 MHz	5322 242 70873
BU1, 2 and 3	DIN SOCKET 8p	5322 267 50659
BU4	DIN SOCKET 6p	5322 267 44075
BU5	DIN SOCKET 7p	4822 264 50101
BU6	D-TYPE SOCKET 15p	5322 267 50882
BU7 (and BU1, 2,3 in /70)	D-TYPE SOCKET 25p	5322 267 60211
	LOCKING SCREW (2) (for connection of d-type socket)	5322 502 64048
	CONTACT STRIP, 36 PINS	5322 265 64078
	SOCKET FOR IC 23 OR IC 8 (32 pins contact strip)	5322 255 40923
L1,L2	COIL 5,5 uH	4822 158 10107
R138, 139, 163	P.T.C. RESISTOR 32 OHM	5322 116 40149
X4	CONNECTOR 11p	5322 265 40804
X5,6,7,8	CONTACT STRIP, 64 PINS	5322 267 60251

6.2 LBB 3386/01

POSNR :	DESCRIPTION :	SERVICE CODE :
	CABLE RELIEF GROMMET	5322 325 50134
	(cables del 1,11 to system PSU)	
	CABLE ASSEMBLY	5322 321 21658
	(cables del 1,11 to system PSU)	
	HEADPHONE JACK SOCKET	5322 267 40568
	MONITOR LOUDSPEAKER AD3371/Y150	4822 240 30172
	POTENTIOMETER LOG. 47K	5322 101 20998
	(for volume control)	
	COMPLETE SERVICE ASSEMBLY PCB	5322 214 90311
	DUBOX SERVICE ASSEMBLY KIT	5322 310 31241
	(25 Crimp-to-wire contacts for use in DUBOX connectors)	
	CABLE ASSEMBLY	5322 321 23155
	(for connection of switch/led)	
	CABLE ASSEMBLY	5322 321 23156
	(for connection of led)	
	CABLE ASSEMBLY	5322 321 23157
	(for connection of monitor l.s.)	
	CABLE ASSEMBLY	5322 321 23158
	(for connection of monitor switch)	
	CABLE ASSEMBLY	5322 321 23159
	(for connection of switch)	
	SHUNT 2p	5322 115 80116
	INSULATOR FOR IC5	5322 255 40792
	BATTERY 3,6V	4822 138 10046
	CRYSTAL 5,068 MHz	5322 242 70873
BU1, 2 and 3	DIN SOCKET 8p	5322 267 50659
BU4	DIN SOCKET 6p	5322 267 44075
BU5	DIN SOCKET 7p	4822 264 50101
BU6	D-TYPE SOCKET 15p	5322 267 50882
BU7	D-TYPE SOCKET 25p	5322 267 60211
	LOCKING SCREW (2)	5322 502 64048
	(for connection of d-type socket)	
	CONTACT STRIP, 36 PINS	5322 265 64078
	SOCKET FOR IC 23 OR IC 8	5322 255 40923
	(32 pins contact strip)	
L1,L2	COIL 5,5 uH	4822 158 10107
R138, 139, 163	P.T.C. RESISTOR 32 OHM	5322 116 40149
X4	CONNECTOR 11p	5322 265 40804
X5,6,7,8	CONTACT STRIP, 64 PINS	5322 267 60251

6.3 LBB 3386/02

POSNR :	DESCRIPTION :	SERVICE CODE :
	CABLE ASSEMBLY (for connection of switch/led)	5322 321 23155
	COMPLETE SERVICE ASSEMBLY PCB	5322 214 90312
	DUBOX SERVICE ASSEMBLY KIT (25 Crimp-to-wire contacts for use in DUBOX connectors)	5322 310 31241
BU1, 2 and 3	D-TYPE SOCKET 25p	5322 267 60211
	LOCKING SCREW (2) (for connection of d-type socket)	5322 502 64048
R124	P.T.C. RESISTOR 32 OHM	5322 116 40149
X1,2,3,4,5	CONTACT STRIP, 64 PINS	5322 267 60251

7 DIAGRAMS

Fig.1 Blockdiagram Audio part of uP/Switch board

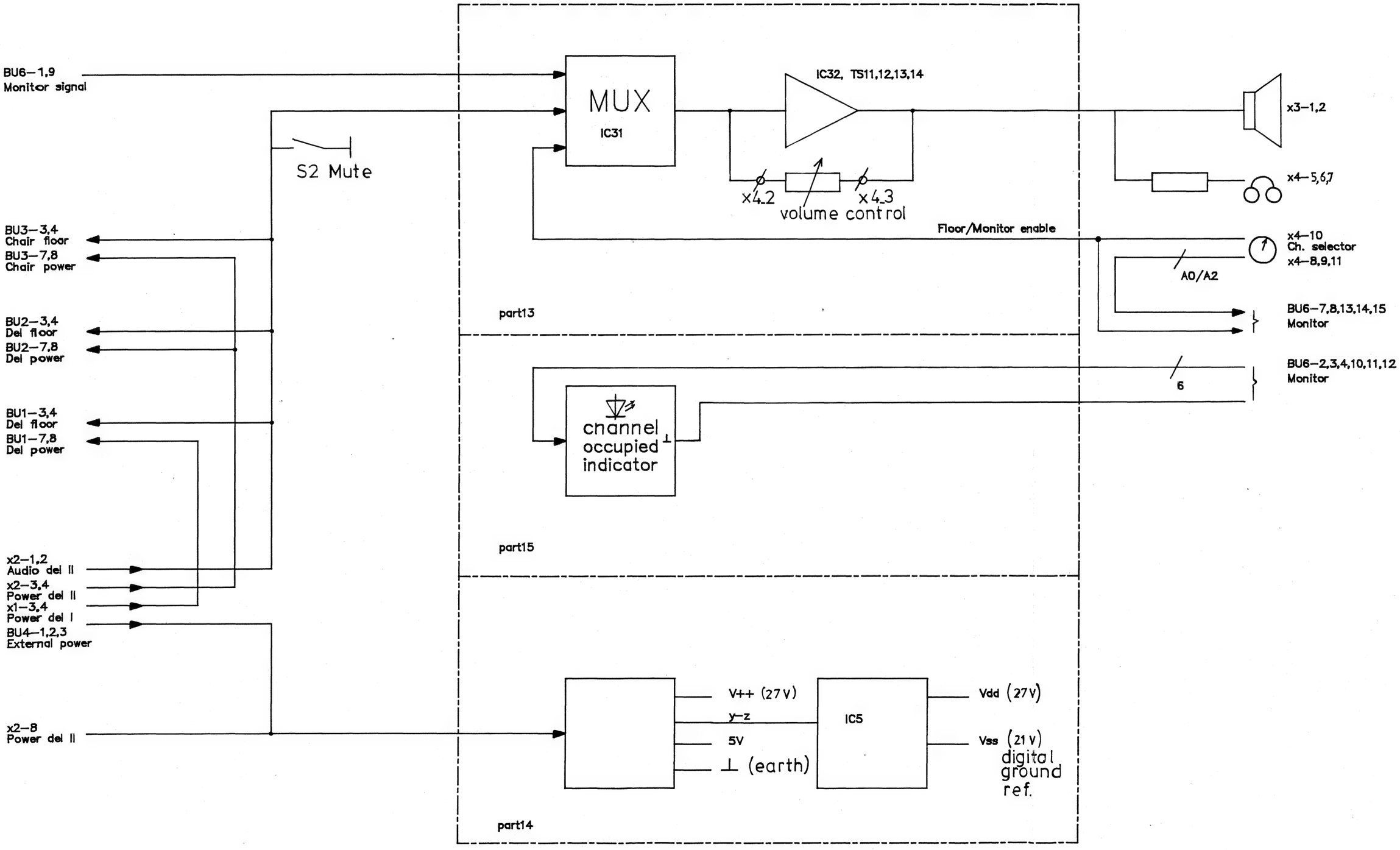


Fig.2 Blockdiagram uP part of uP/Switch board

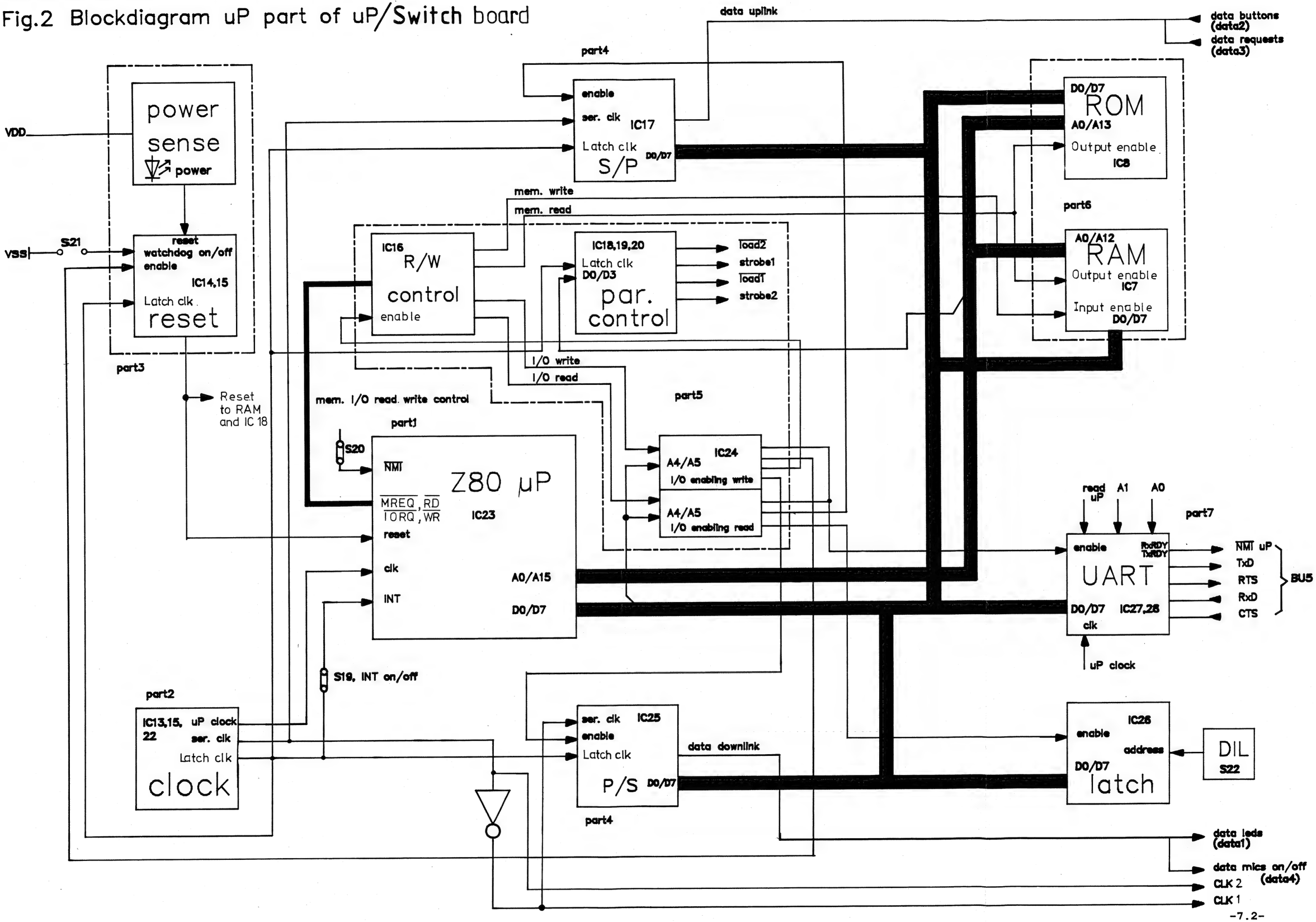


Fig.3 Blockdiagram I/O/Switch part of up/Switch board

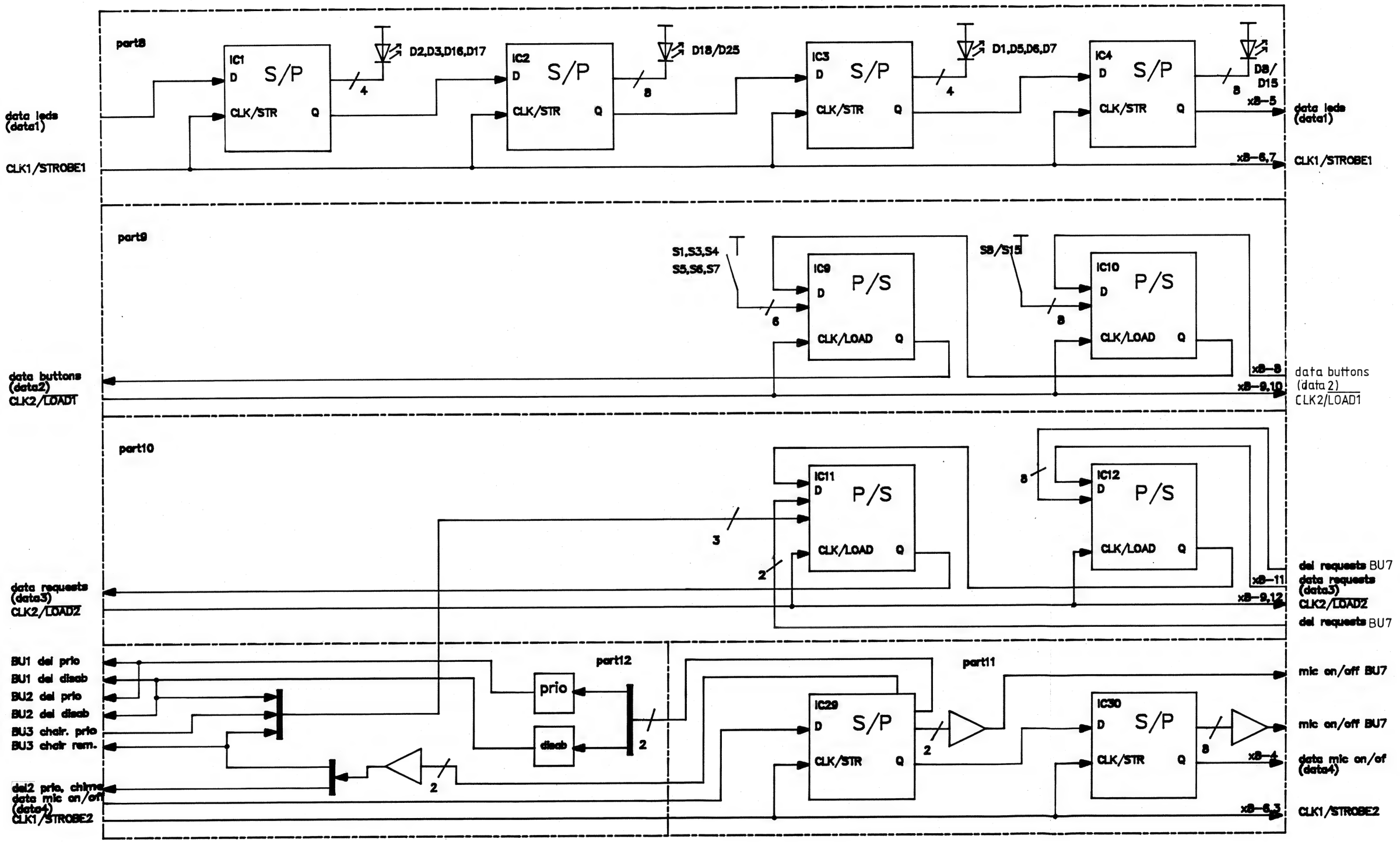
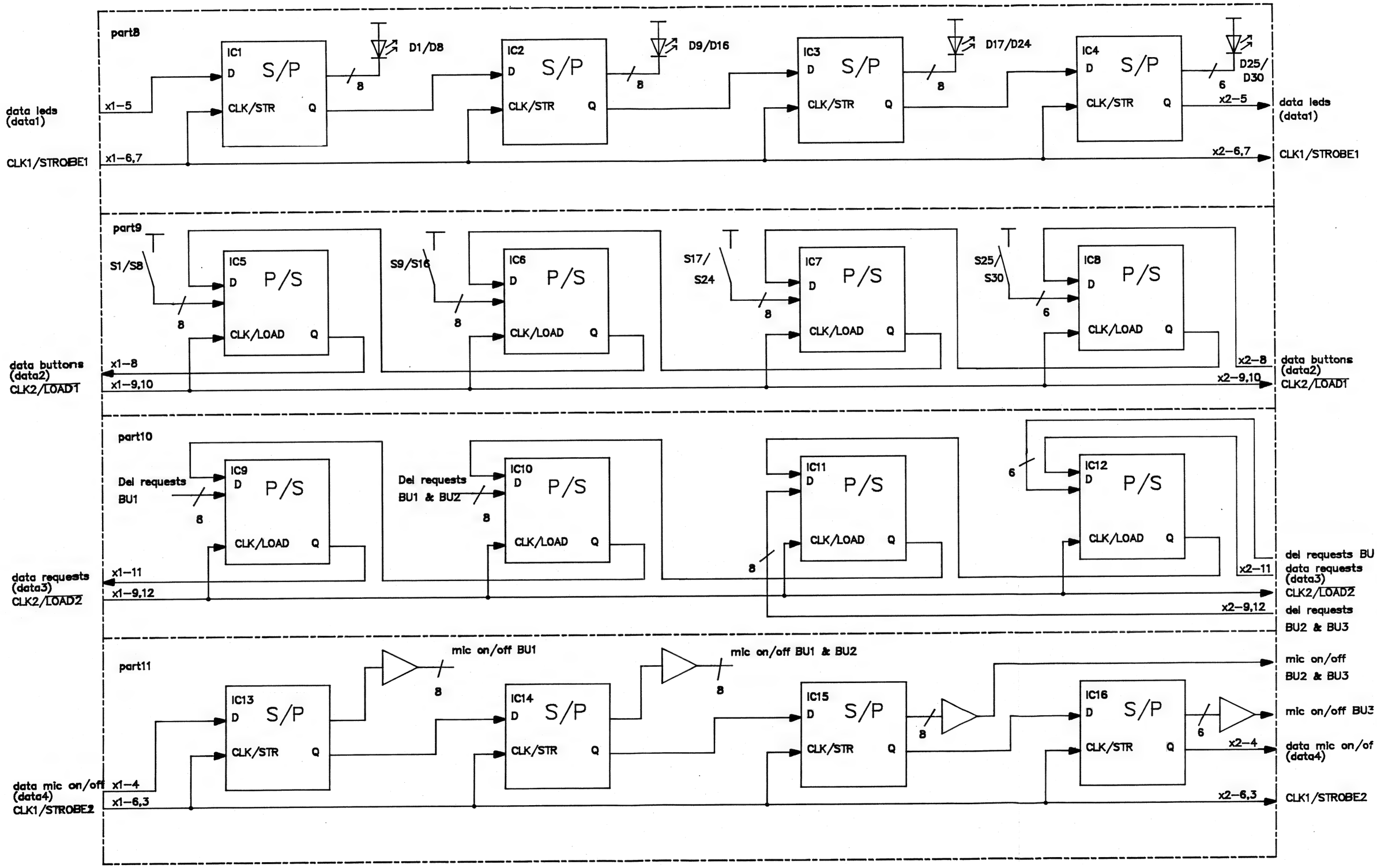


Fig.4 Blockdiagram I/O/Switch board



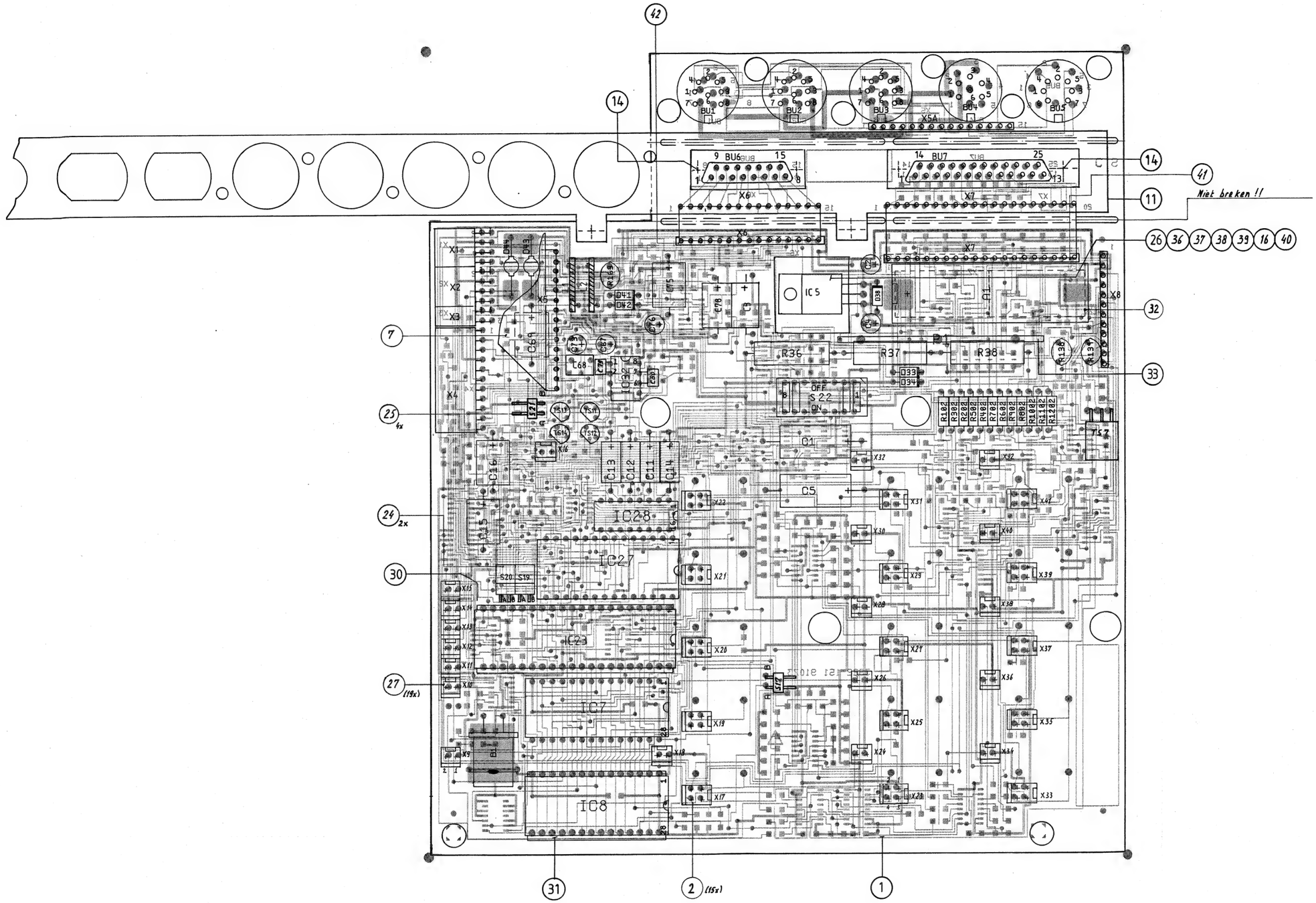


FIG. 5-1 ASSEMBLY DIAGRAM OF uP/SWITCH BOARD, TOP SIDE

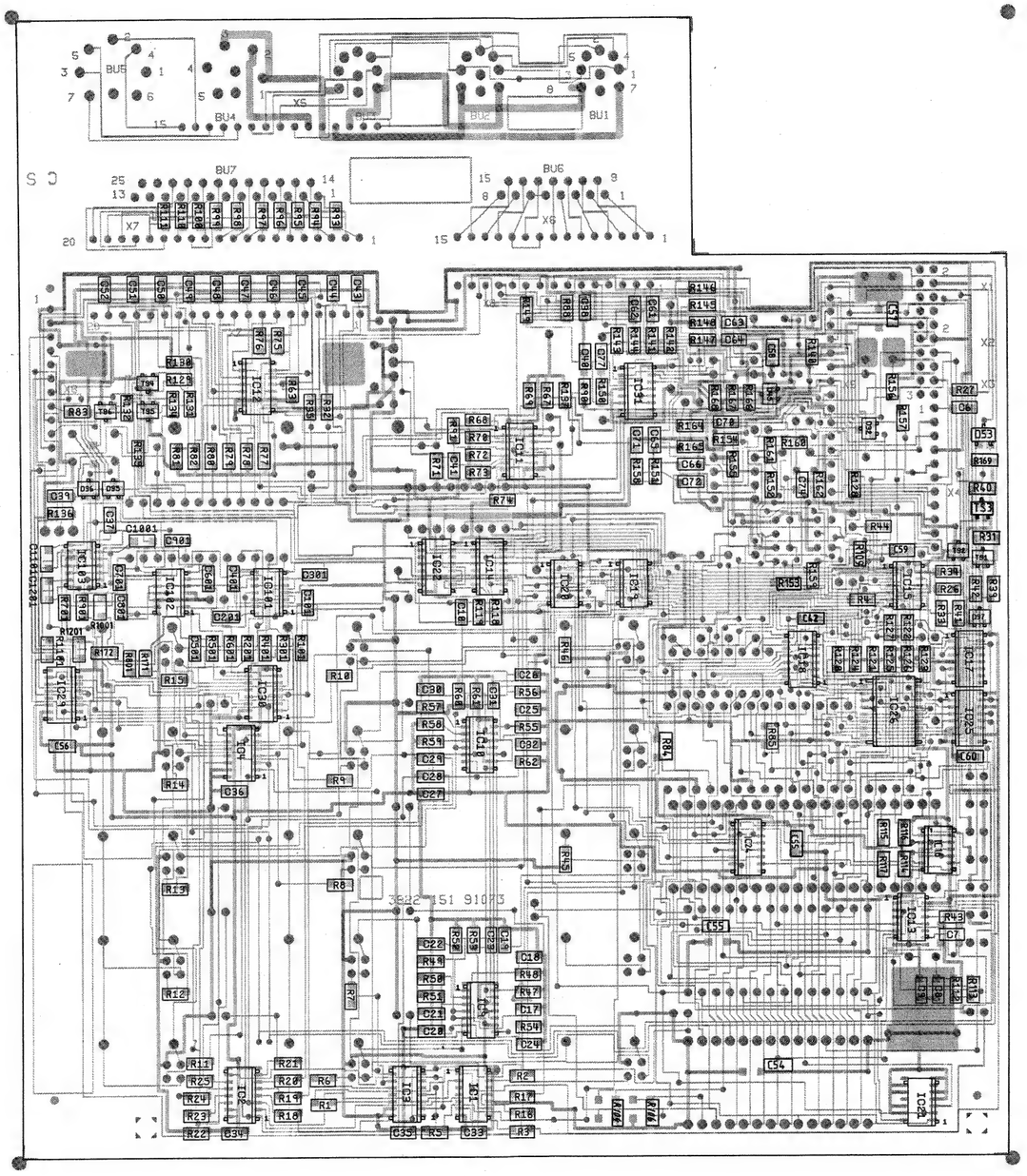


FIG. 5-2 ASSEMBLY DIAGRAM OF uP/SWITCH BOARD, BOTTOM SIDE

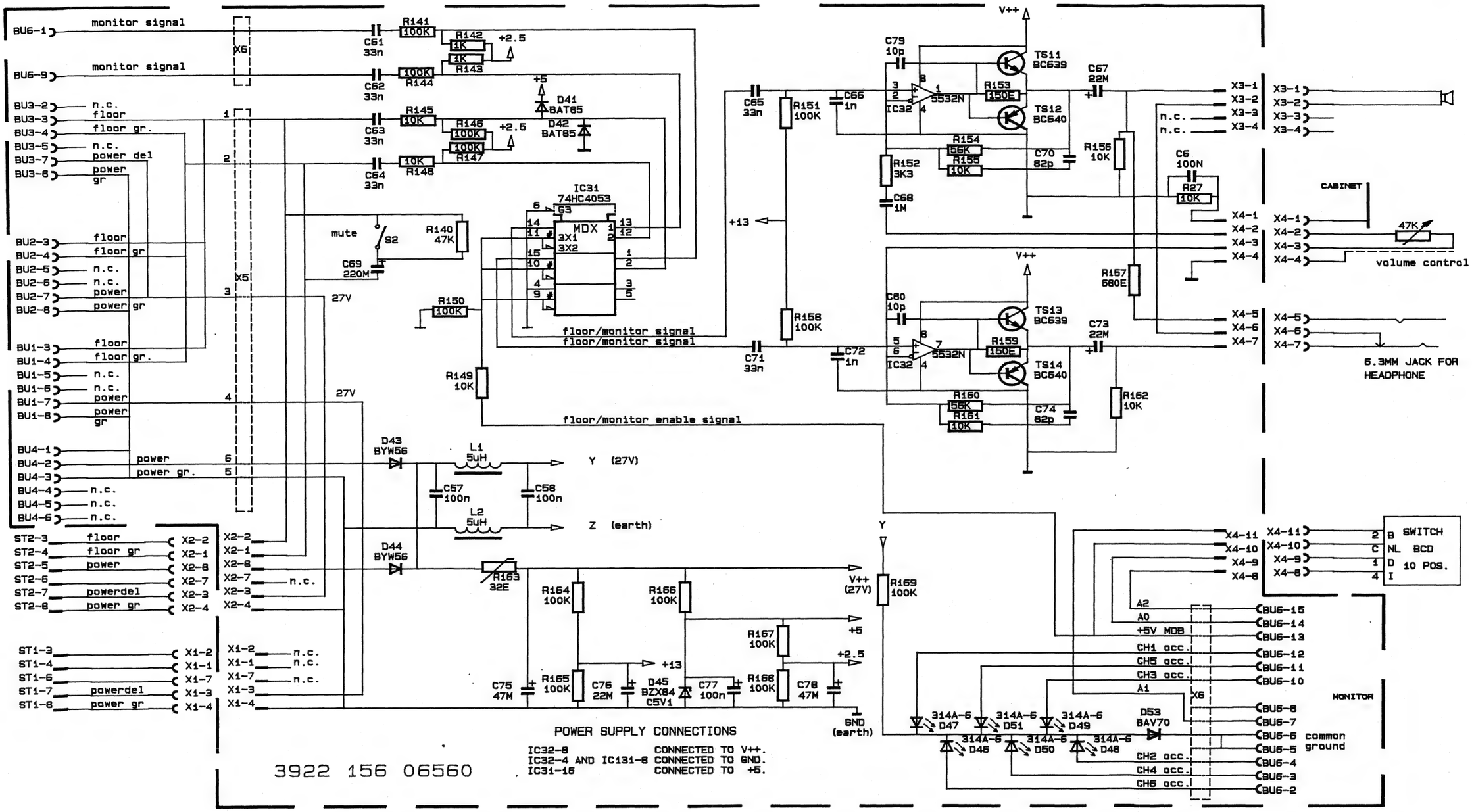
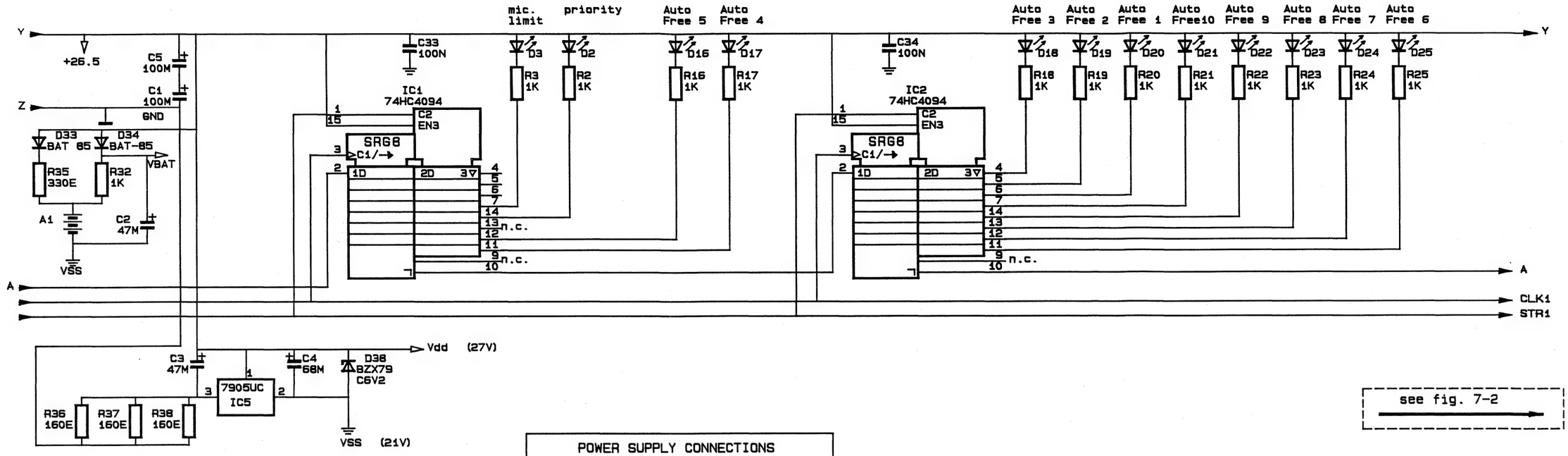


FIG.6 CIRCUITDIAGRAM AUDIO PART OF UP/SWITCH BOARD

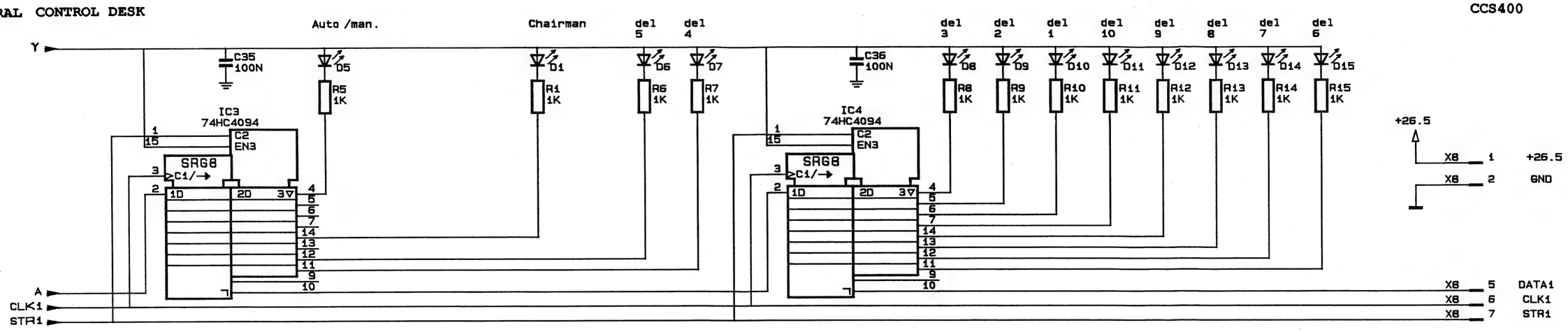


see fig. 7-2

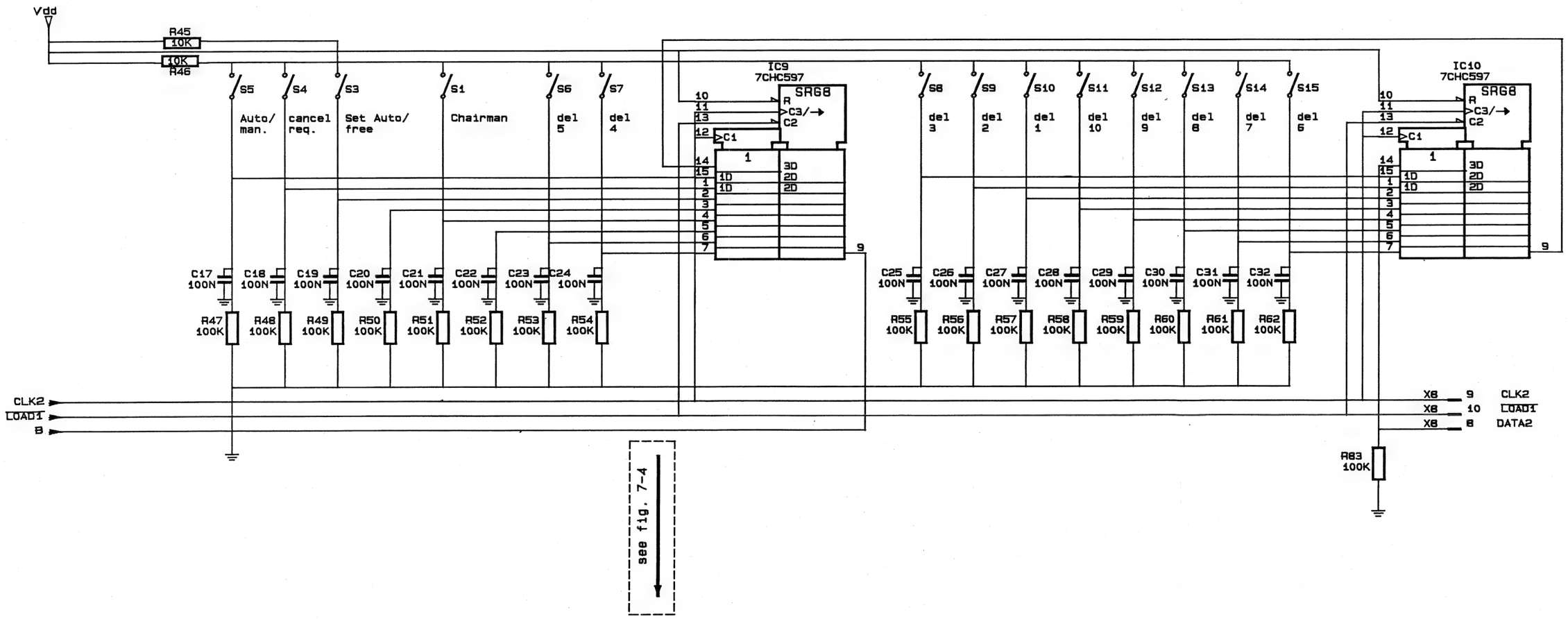
POWER SUPPLY CONNECTIONS				
	Vdd	Vbat	Vss	GND*
IC1	PIN 16		PIN 8	
IC2	PIN 16		PIN 8	
IC3	PIN 16		PIN 8	
IC4	PIN 16		PIN 8	
IC5	PIN 1		PIN 2	
IC7		PIN 28	PIN 14	
IC8	PIN 28		PIN 14	
IC9	PIN 16		PIN 8	
IC10	PIN 16		PIN 8	
IC11	PIN 16		PIN 8	
IC12	PIN 16		PIN 8	
IC13	PIN 14		PIN 7	
IC14	PIN 16		PIN 8	
IC15	PIN 14		PIN 7	
IC16	PIN 14		PIN 8	
IC17	PIN 16		PIN 8	
IC18	PIN 16		PIN 8	
IC19	PIN 14		PIN 7	
IC20	PIN 14		PIN 7	
IC21		PIN 14	PIN 7	
IC22	PIN 16		PIN 8	
IC23	PIN 11		PIN 29	
IC24	PIN 16		PIN 8	
IC25	PIN 16		PIN 8	
IC26	PIN 20		PIN 10	
IC27	PIN 26		PIN 4	
IC28	PIN 16		PIN 15	
IC29	PIN 16		PIN 8	
IC30	PIN 16		PIN 8	
IC101	PIN 4			PIN 11
IC102	PIN 4			PIN 11
IC103	PIN 4			PIN 11

see fig. 7-3

FIG. 7-1 CIRCUIT DIAGRAM UP- AND I/O /SWITCH PART OF UP/ SWITCH BOARD



see fig. 7-1



see fig. 7-4

FIG. 7-2 CIRCUIT DIAGRAM UP- AND I/O/SWITCH PART OF UP/SWITCH BOARD

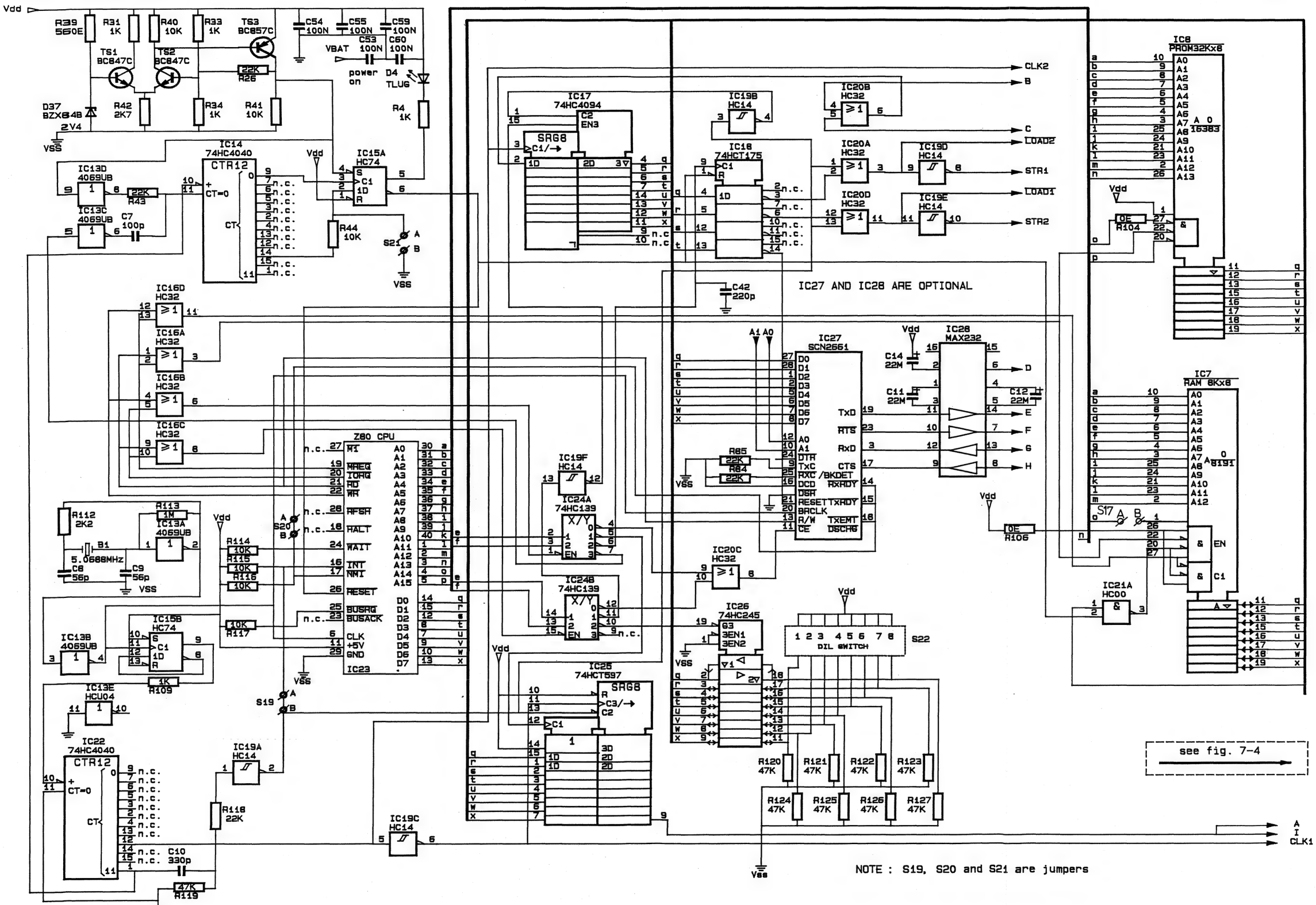


FIG. 7-3 CIRCUIT DIAGRAM UP- AND I/O/SWITCH PART OF UP/SWITCH BOARD

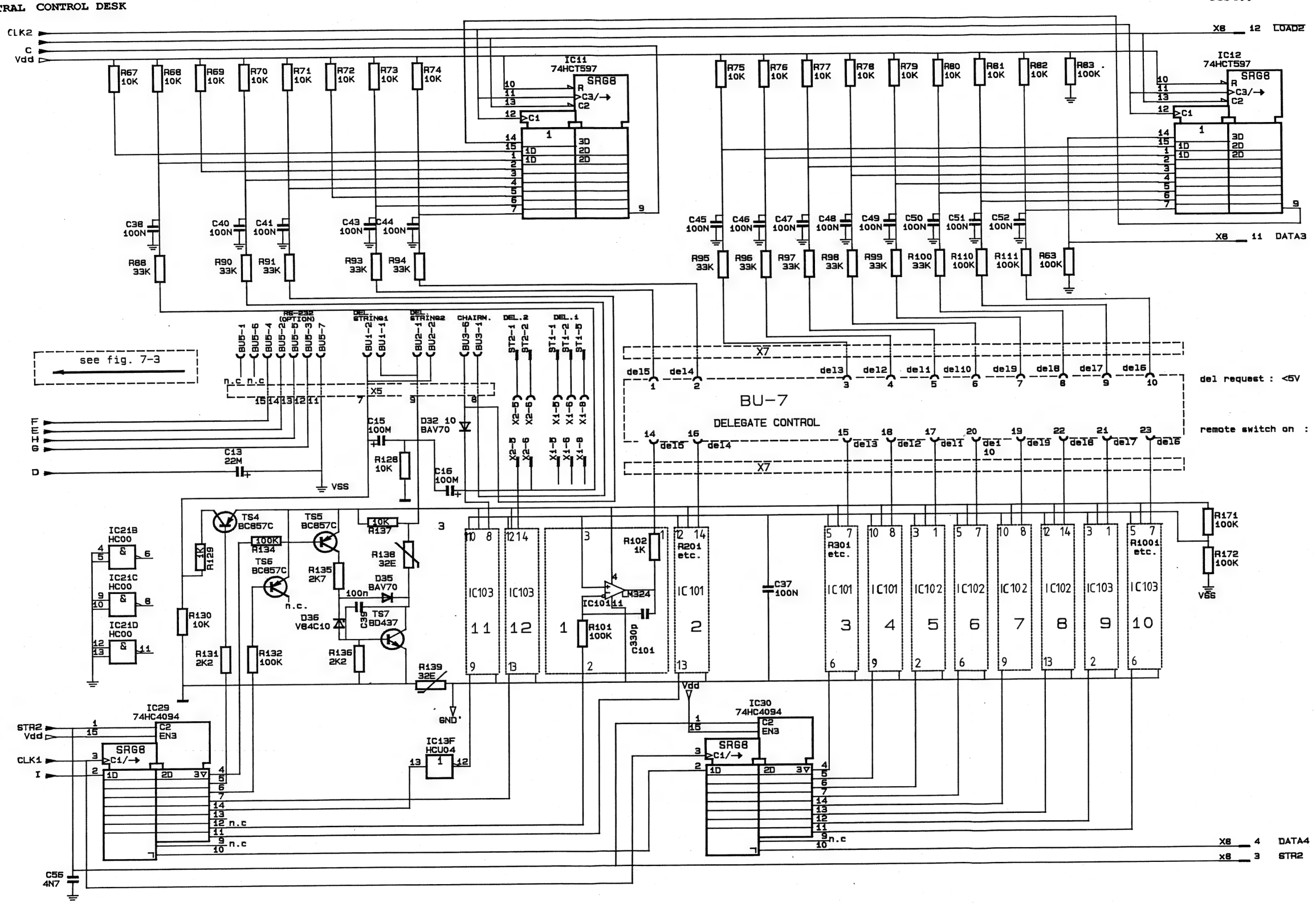


FIG. 7-4 CIRCUIT DIAGRAM UP- AND I/O/SWITCH PART OF UP/SWITCH BOARD

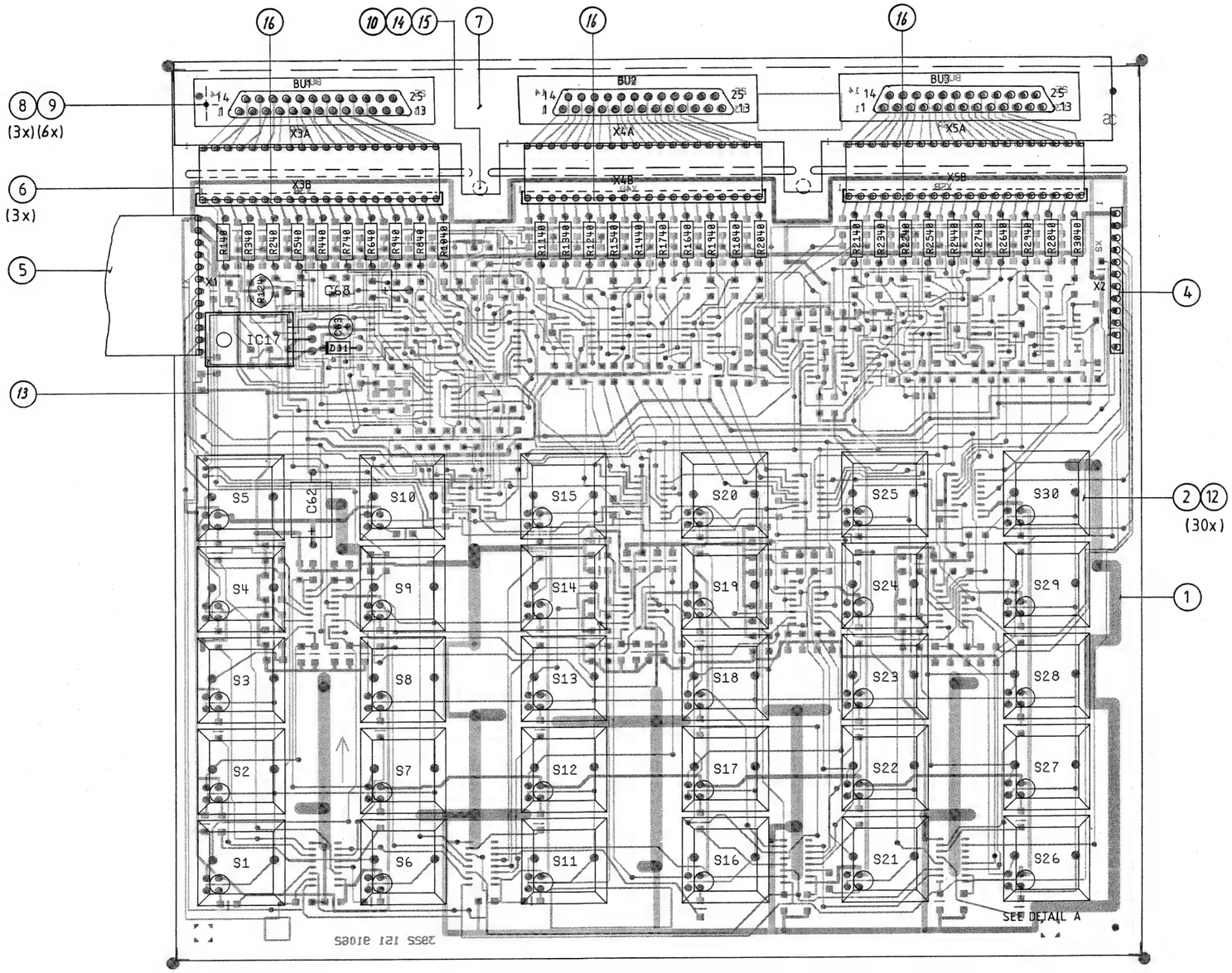


FIG. 8-1 ASSEMBLY DIAGRAM OF I/O/SWITCH BOARD, TOP SIDE

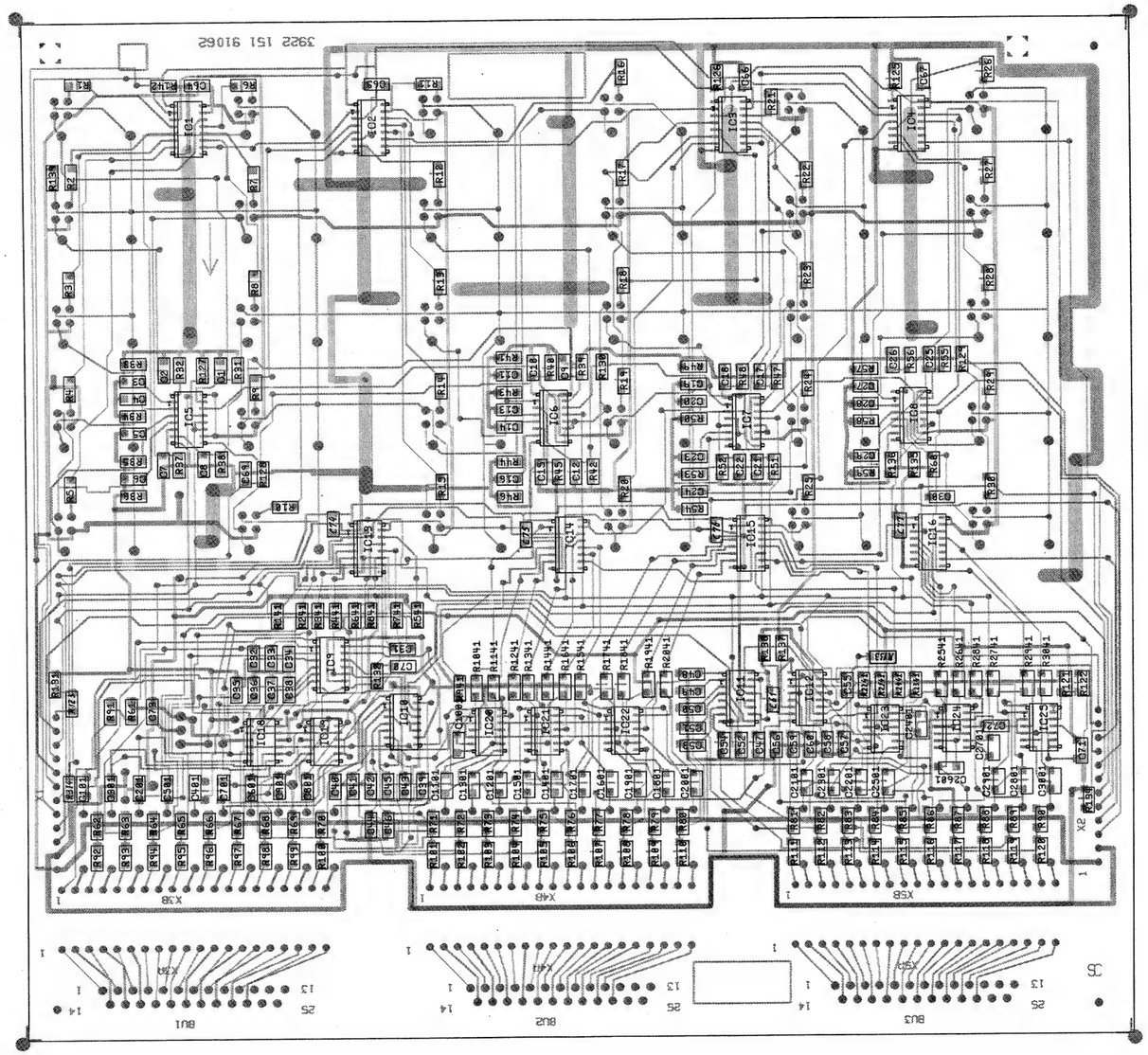
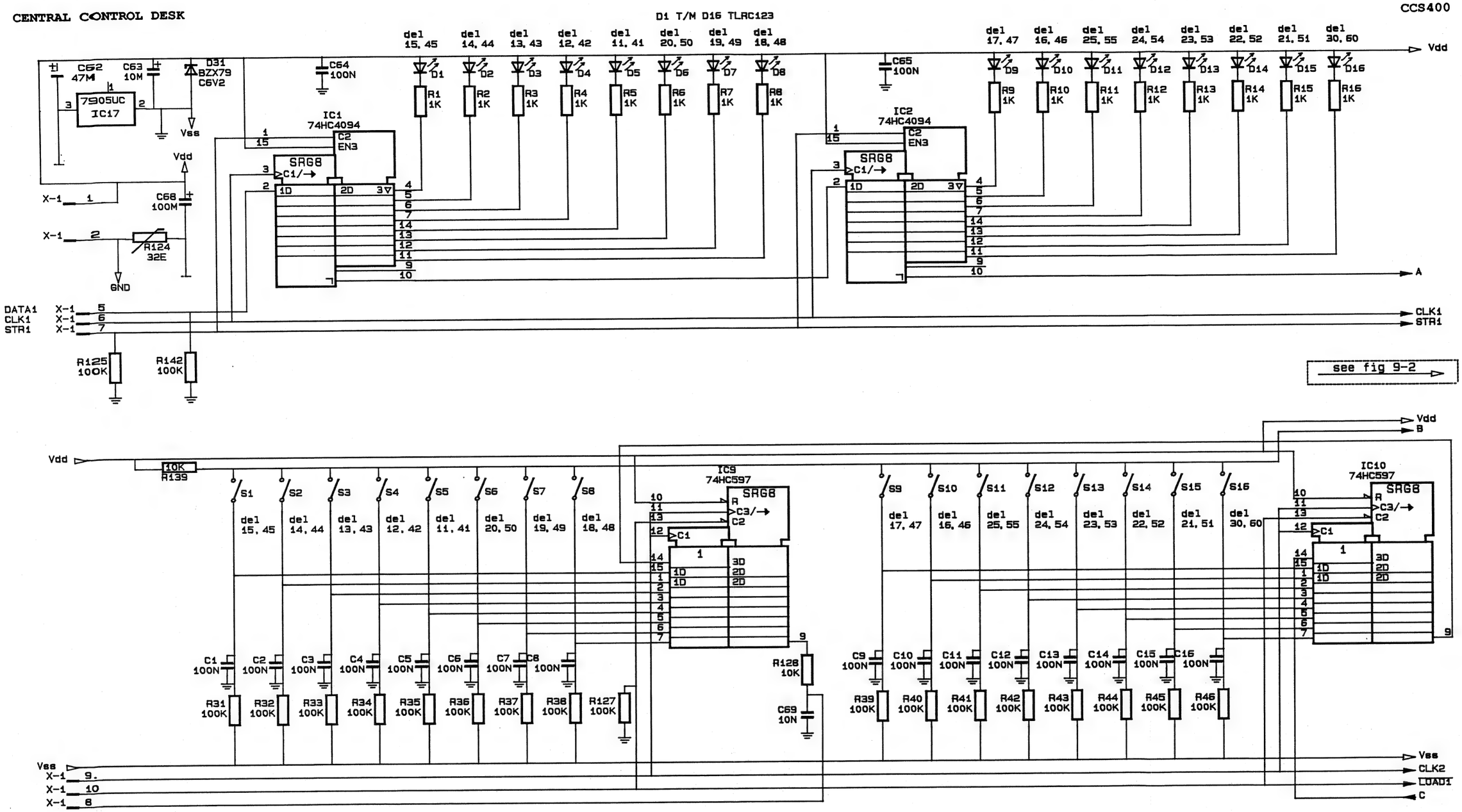


FIG. 8-2 ASSEMBLY DIAGRAM OF I/O/SWITCH BOARD, BOTTOM SIDE

CENTRAL CONTROL DESK

D1 T/M D16 TLRC123



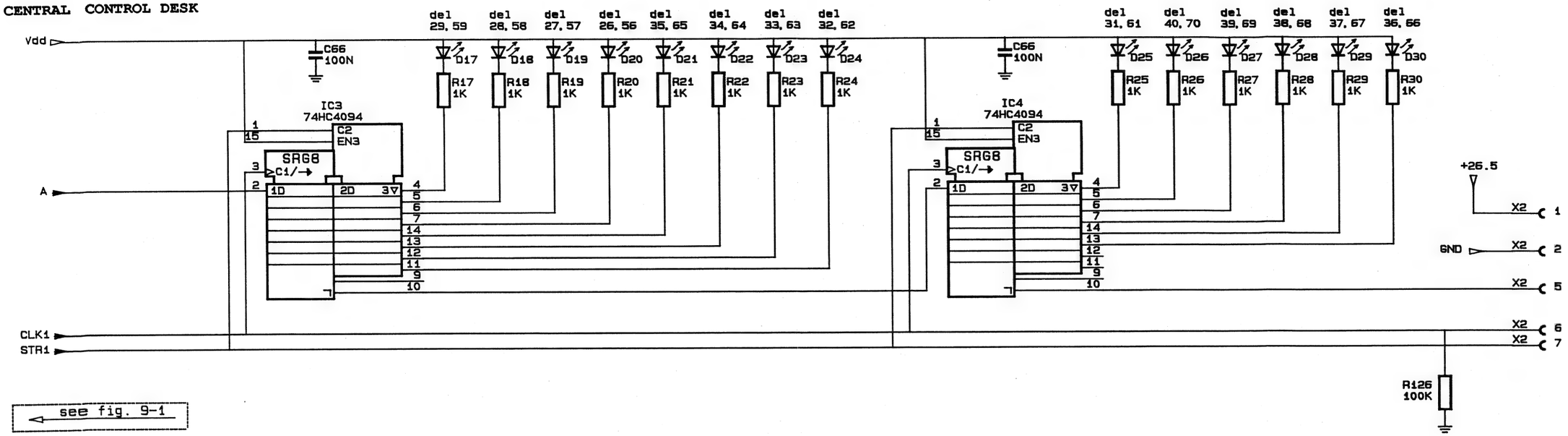
see fig 9-2

POWER SUPPLY CONNECTIONS

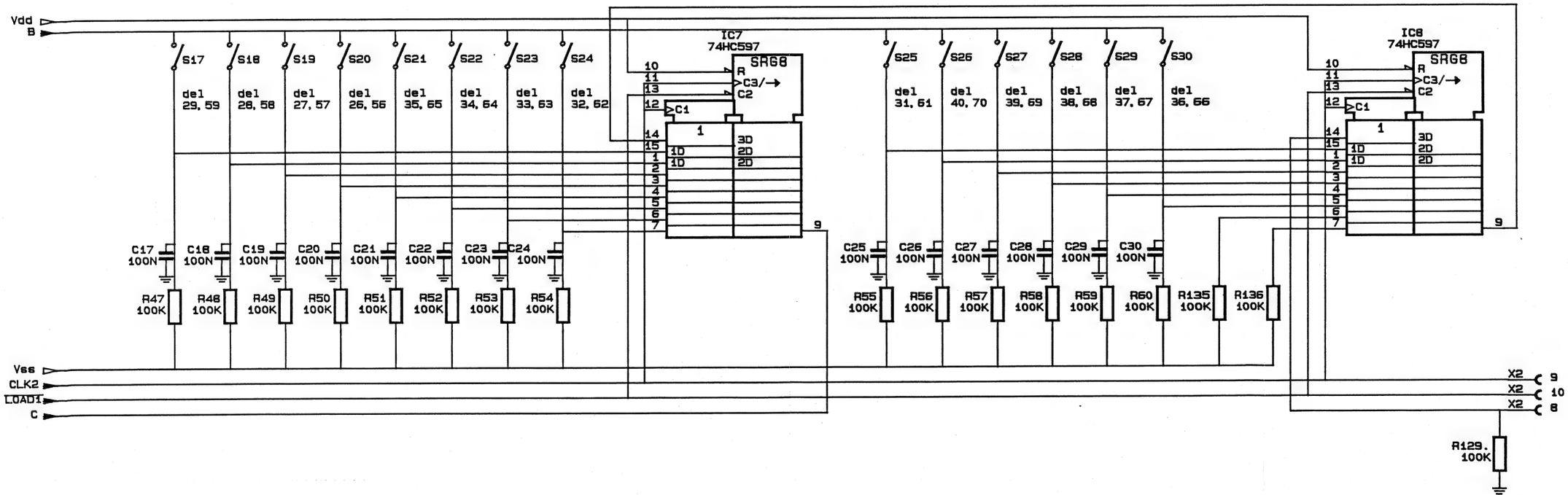
I.C 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	Pt.8 connected to	(V+) -5V	
"	Pt.16	V+	
I.C 18, 19, 20, 21, 22, 23, 24, 25	Pt.4	V+	
"	Pt.11	⊥	

FIG. 9-1 CIRCUIT DIAGRAM OF I/O/SWITCH BOARD

CENTRAL CONTROL DESK



see fig. 9-1



POWER SUPPLY CONNECTIONS

I.C 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	Pt.8	connected to	"(V+) -5V"
"	Pt.16	"	" V+ "
I.C 18, 19, 20, 21, 22, 23, 24, 25	Pt.4	"	" V+ "
"	Pt.11	"	" ⊥ "

FIG. 9-2 CIRCUIT DIAGRAM OF I/O/SWITCH BOARD

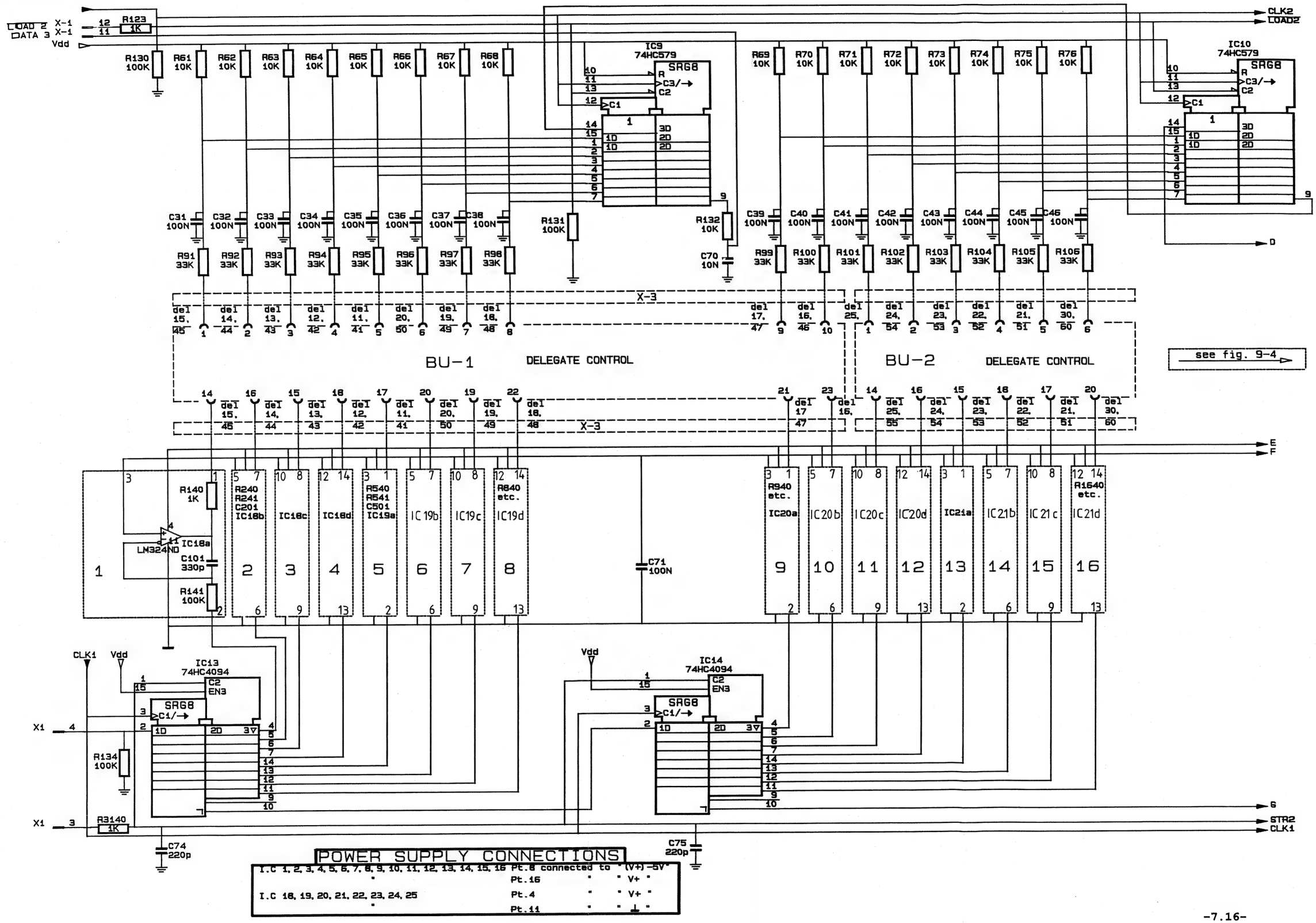


FIG. 9-3 CIRCUIT DIAGRAM OF I/O/SWITCH BOARD

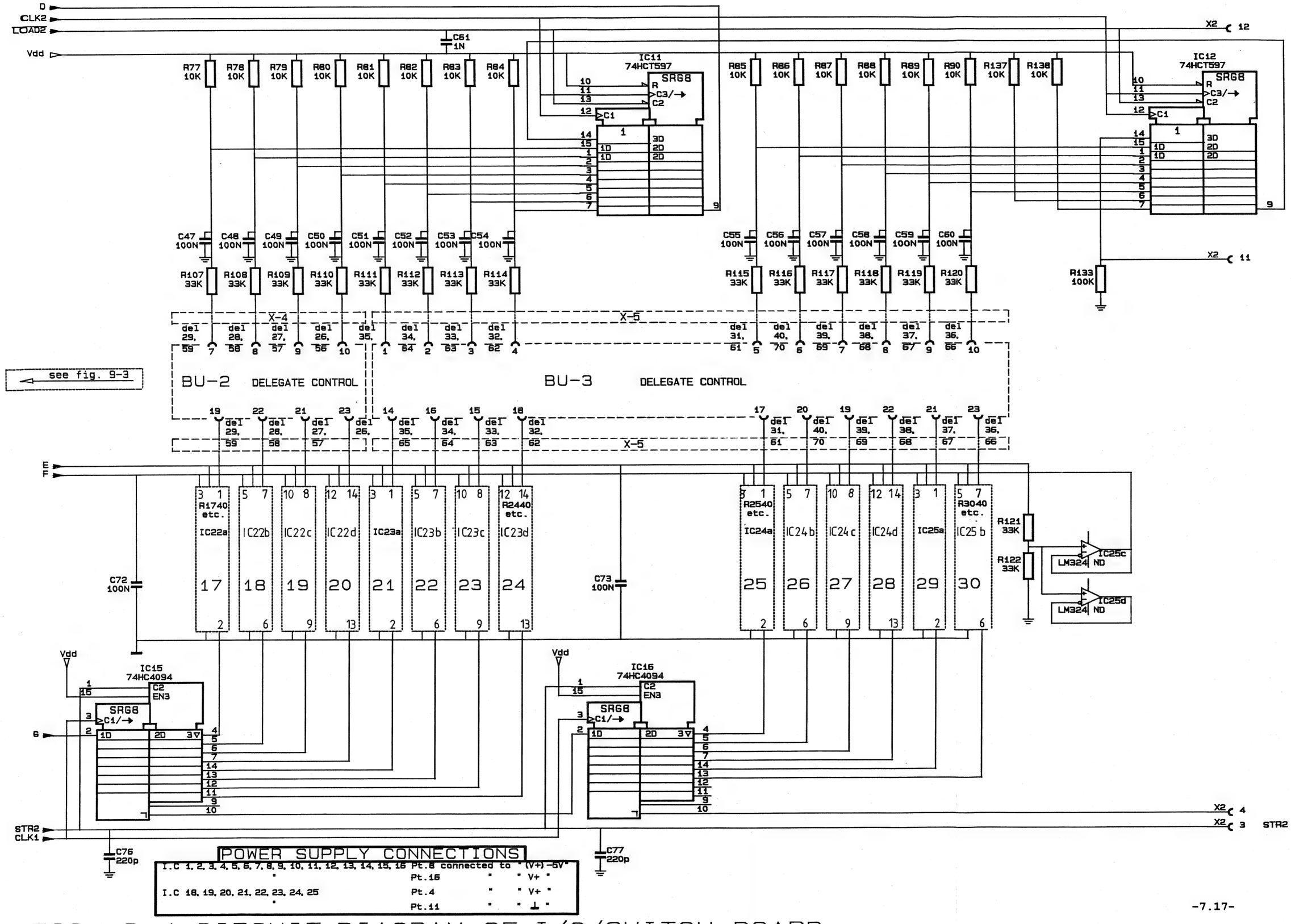


FIG. 9-4 CIRCUIT DIAGRAM OF I/O/SWITCH BOARD

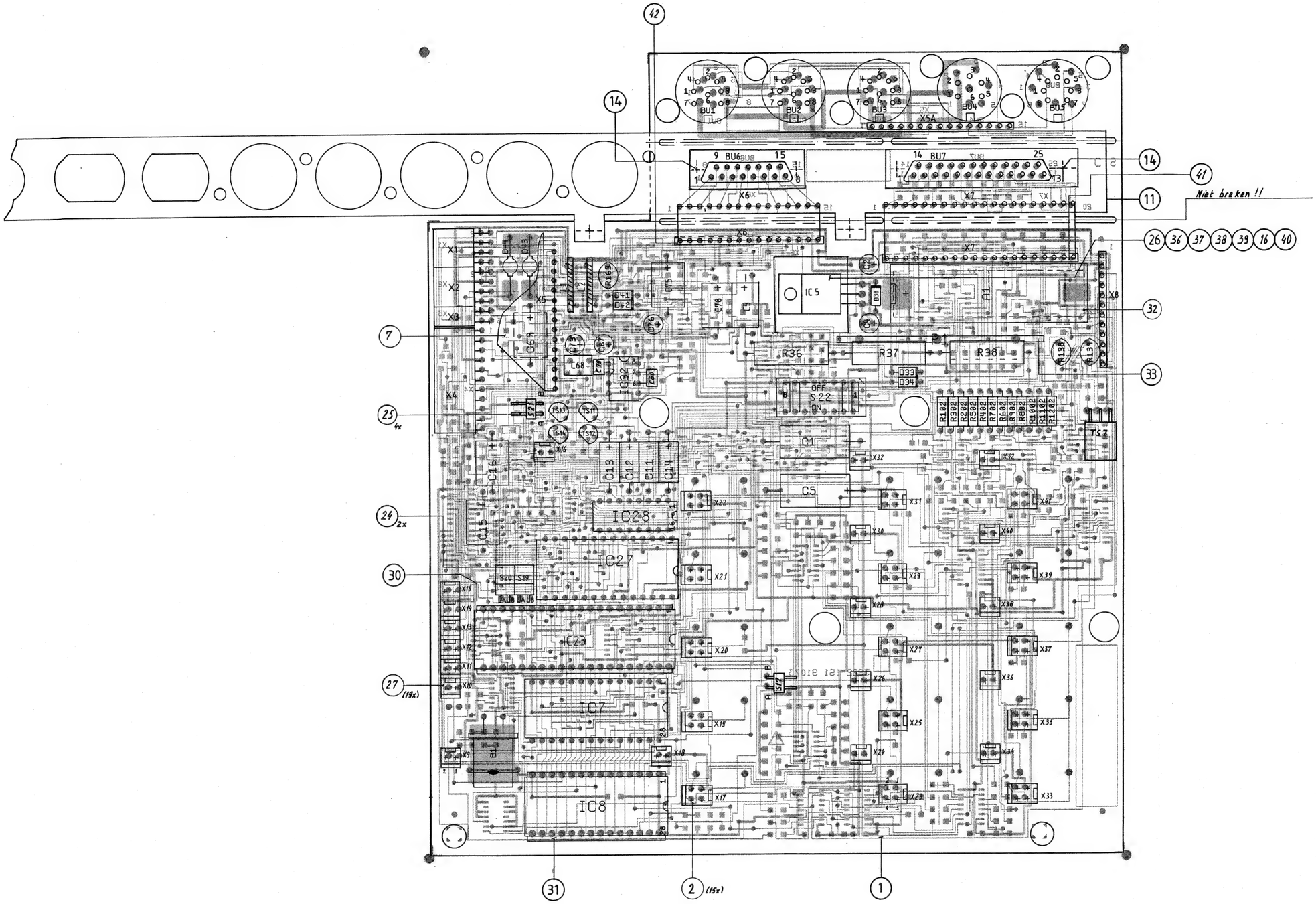


FIG. 10-1 ASSEMBLY DIAGRAM OF LBB 3386/01, TOP SIDE

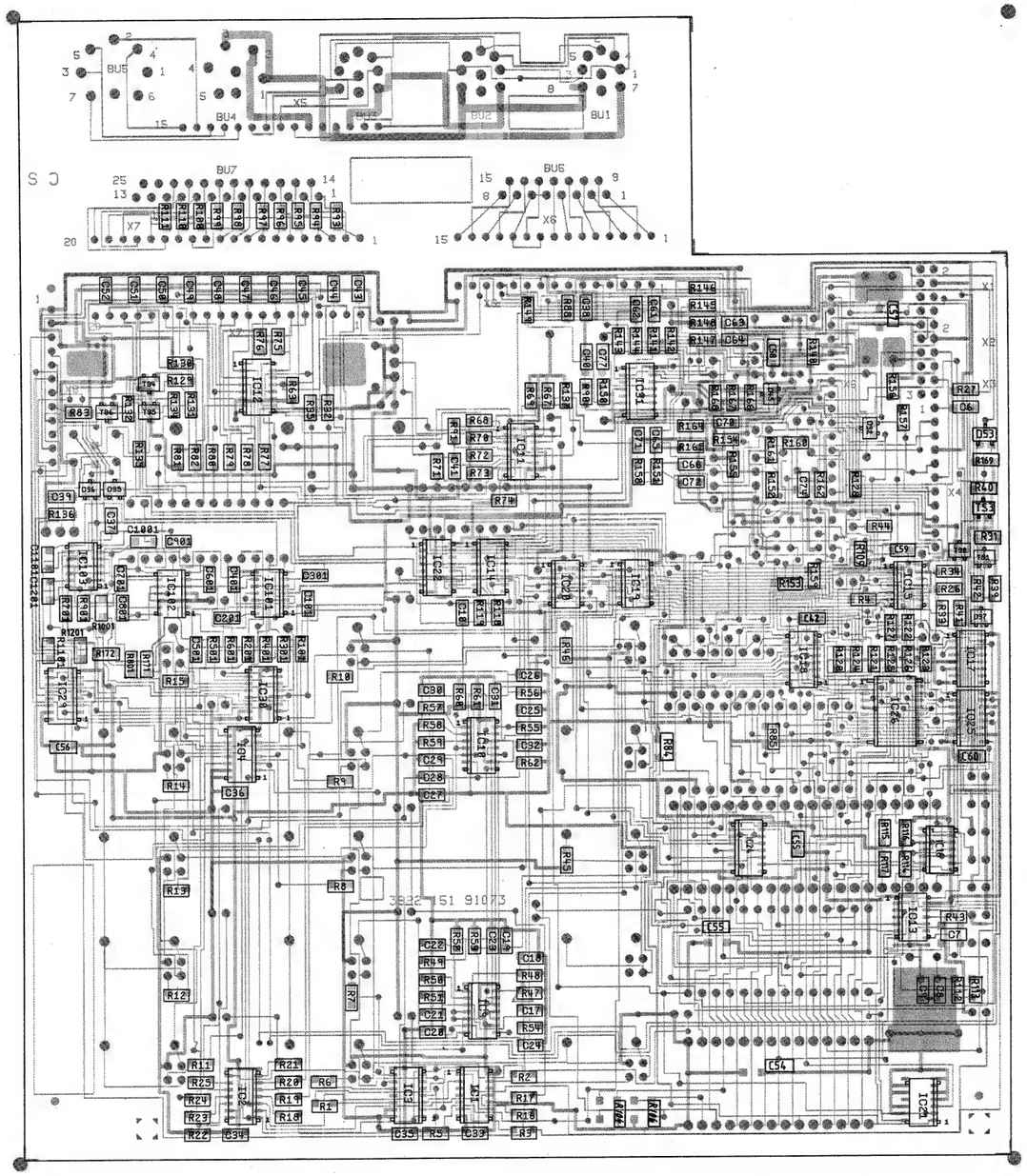
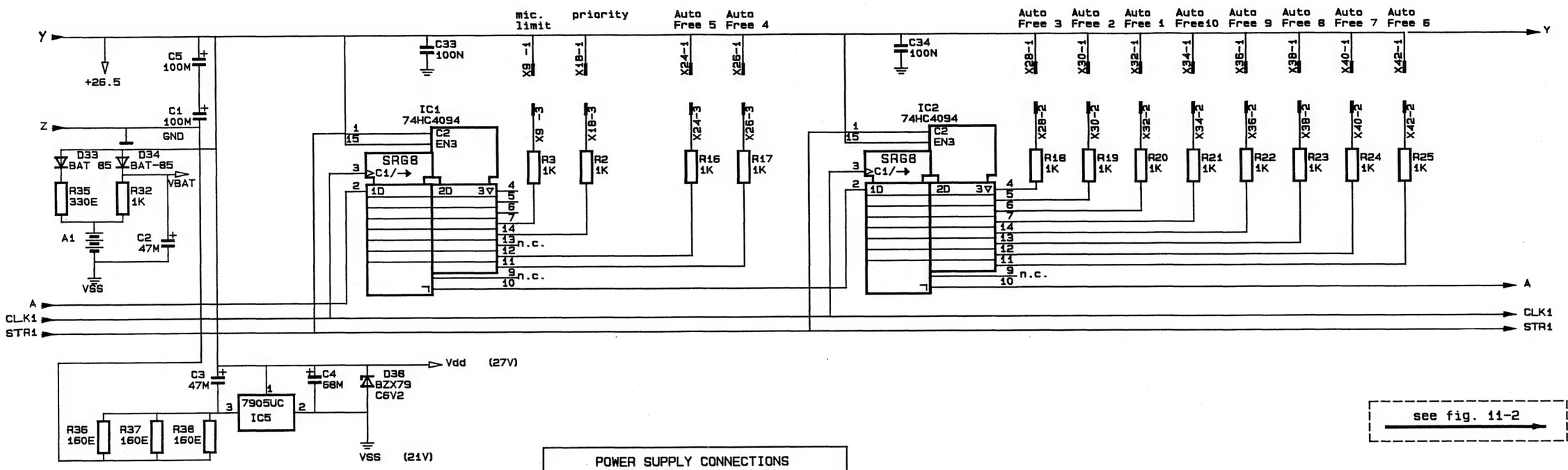


FIG. 10-2 ASSEMBLY DIAGRAM OF LBB 3386/01, BOTTOM SIDE



see fig. 11-2

see fig. 11-3

POWER SUPPLY CONNECTIONS

	Vdd	Vbat	Vss	GND'
IC1	PIN 16		PIN 8	
IC2	PIN 16		PIN 8	
IC3	PIN 16		PIN 8	
IC4	PIN 16		PIN 8	
IC5	PIN 1		PIN 2	
IC7		PIN 28	PIN 14	
IC8	PIN 28		PIN 14	
IC9	PIN 16		PIN 8	
IC10	PIN 16		PIN 8	
IC11	PIN 16		PIN 8	
IC12	PIN 16		PIN 8	
IC13	PIN 14		PIN 7	
IC14	PIN 16		PIN 8	
IC15	PIN 14		PIN 7	
IC16	PIN 14		PIN 8	
IC17	PIN 16		PIN 8	
IC18	PIN 16		PIN 8	
IC19	PIN 14		PIN 7	
IC20	PIN 14		PIN 7	
IC21		PIN 14	PIN 7	
IC22	PIN 16		PIN 8	
IC23	PIN 11		PIN 29	
IC24	PIN 16		PIN 8	
IC25	PIN 16		PIN 8	
IC26	PIN 20		PIN 10	
IC27	PIN 26		PIN 4	
IC28	PIN 16		PIN 15	
IC29	PIN 16		PIN 8	
IC30	PIN 16		PIN 8	
IC101	PIN 4			PIN 11
IC102	PIN 4			PIN 11
IC103	PIN 4			PIN 11

FIG. 11-1 CIRCUIT DIAGRAM OF LBB 3386/01

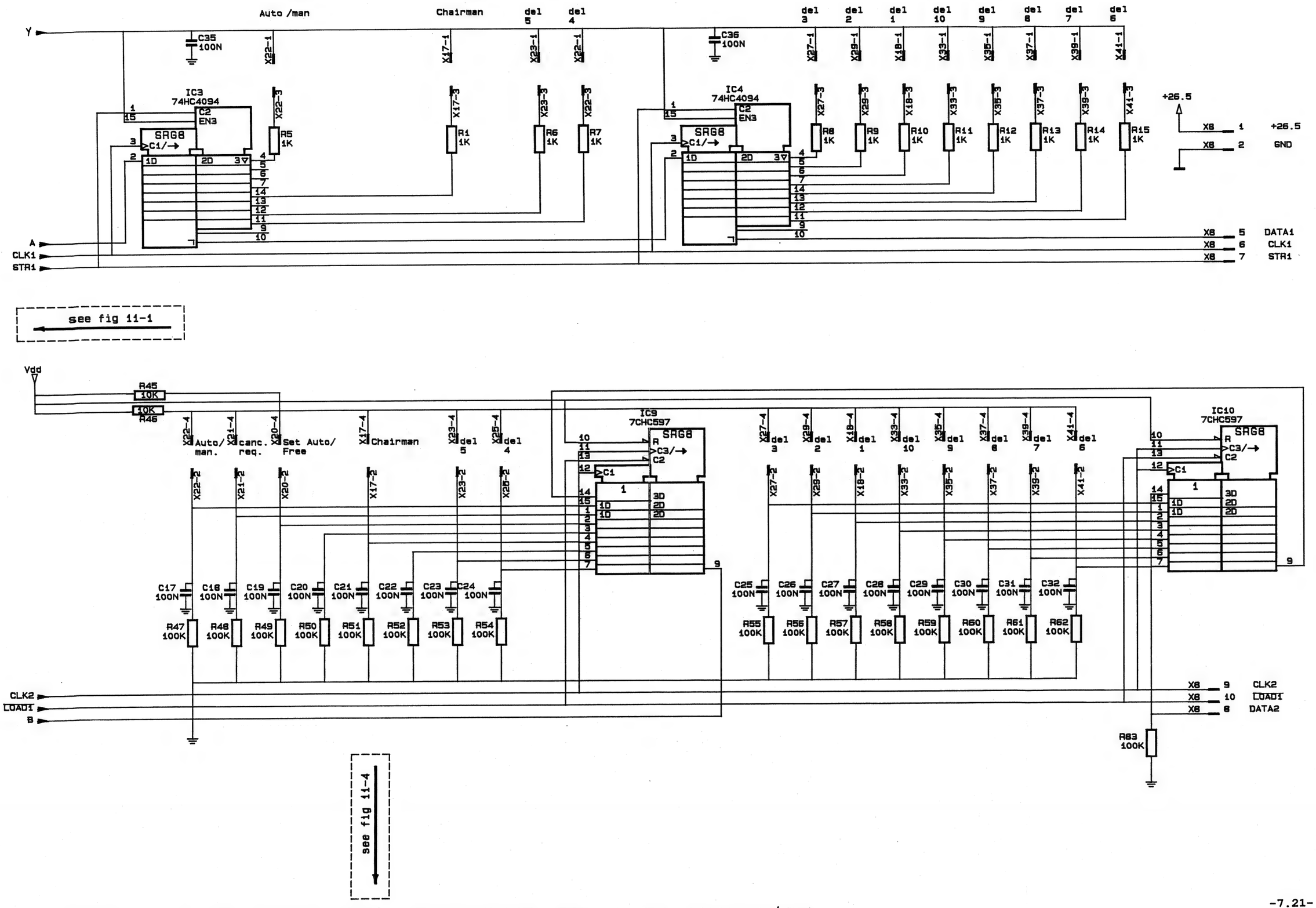


FIG. 11-2 CIRCUIT DIAGRAM OF LBB 3386/01

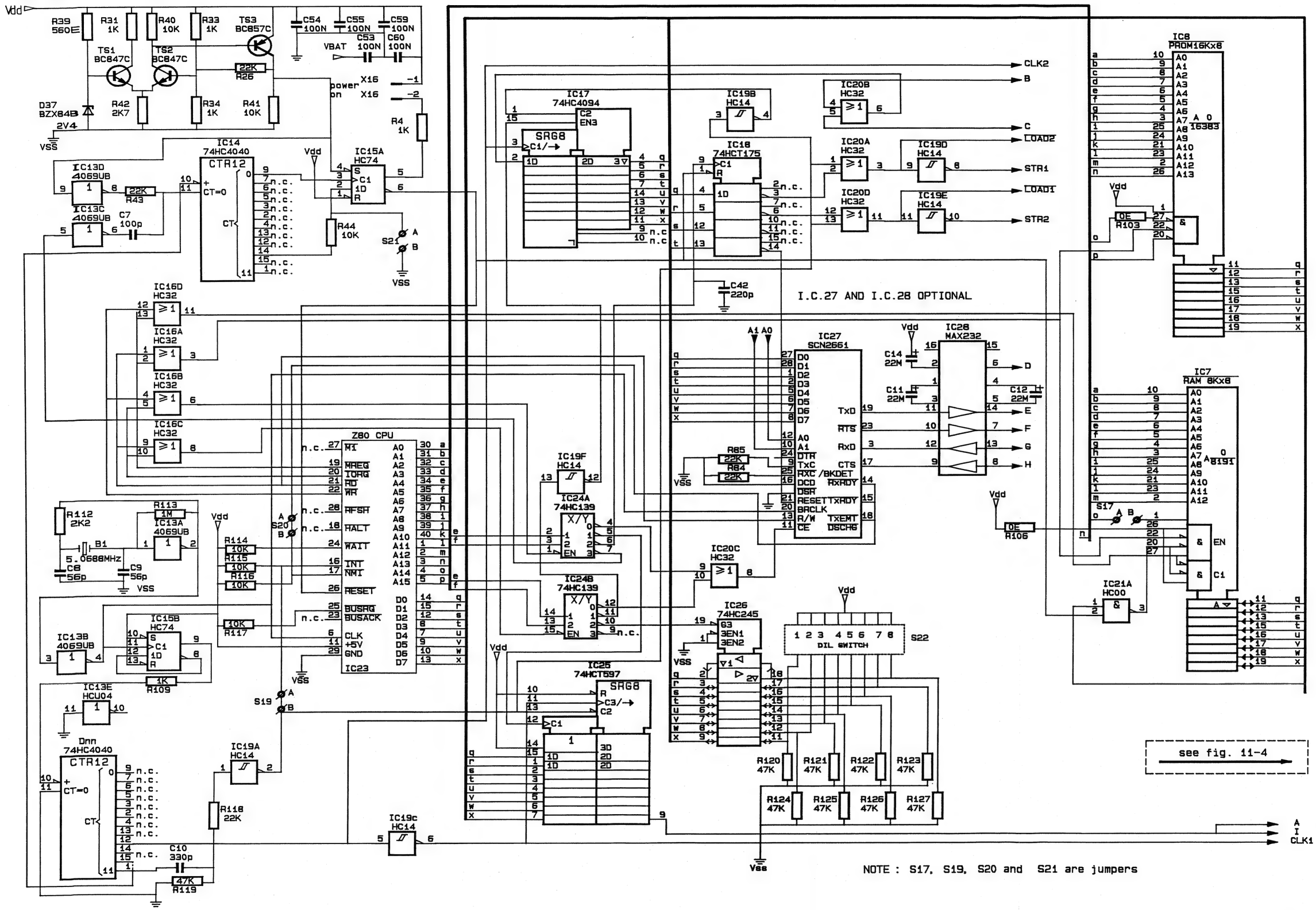


FIG. 11-3 CIRCUIT DIAGRAM OF LBB 3386/01

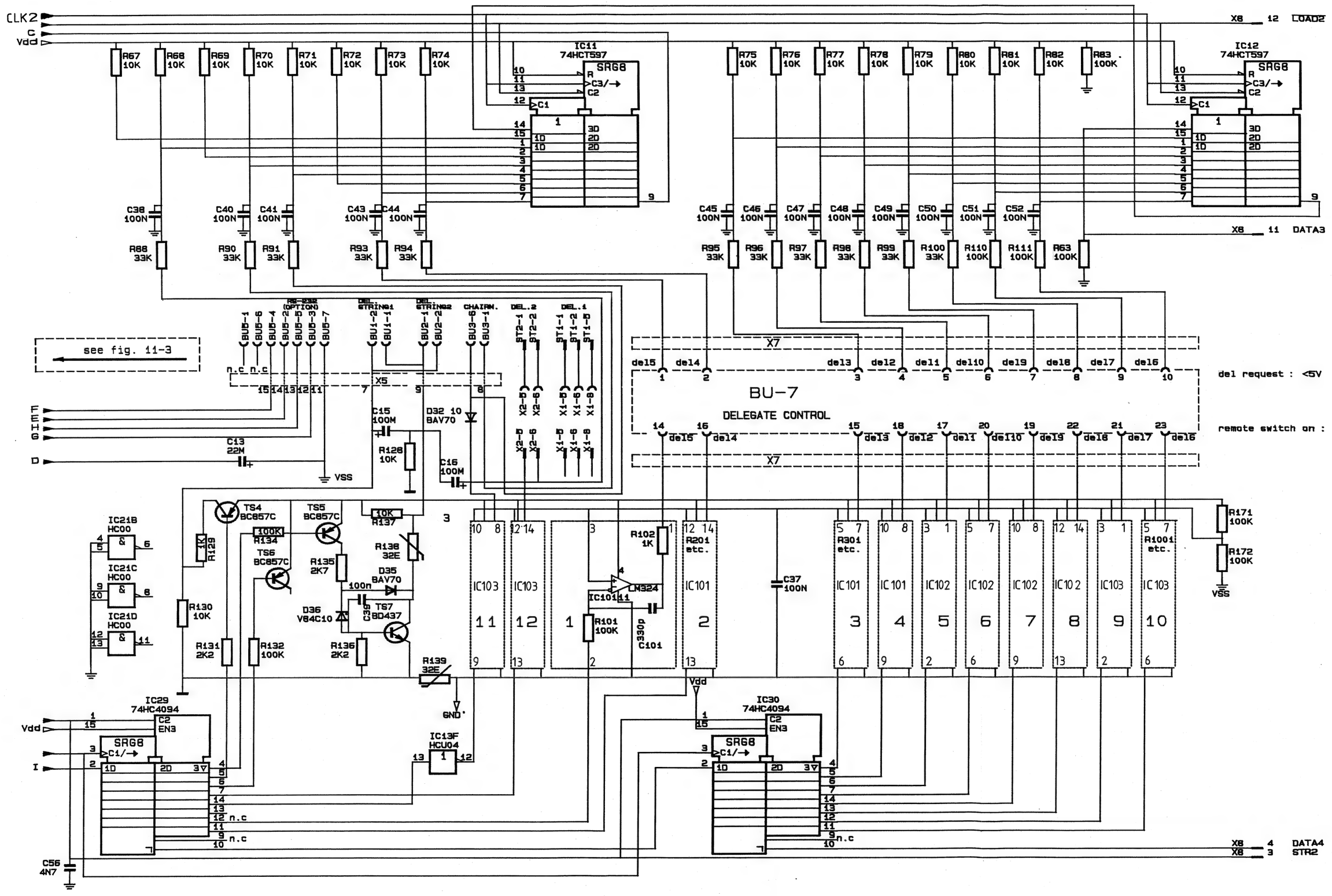


FIG. 11-4 CIRCUIT DIAGRAM OF LBB 3386/01

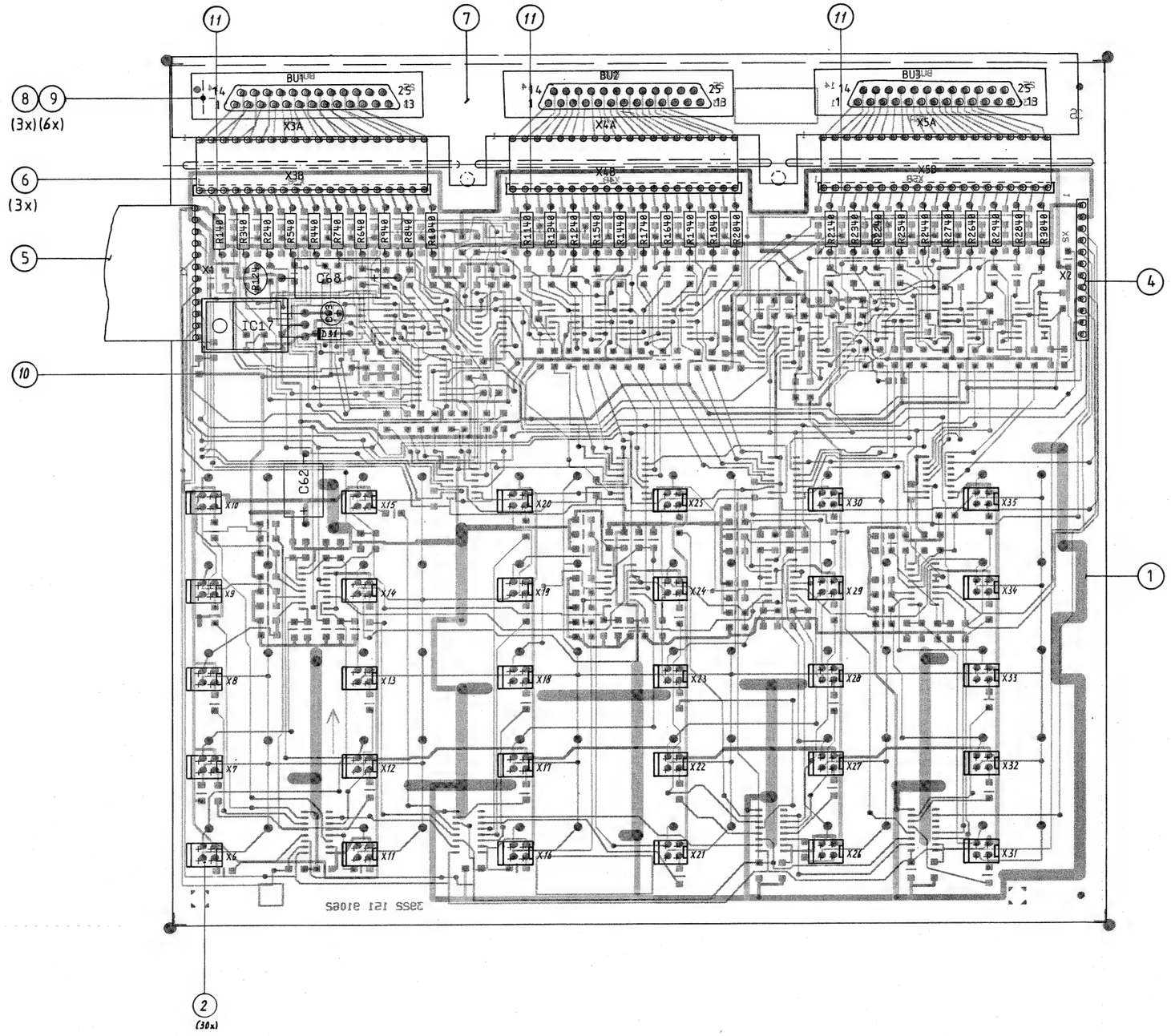


FIG. 12-1 ASSEMBLY DIAGRAM OF LBB 3386/02, TOP SIDE

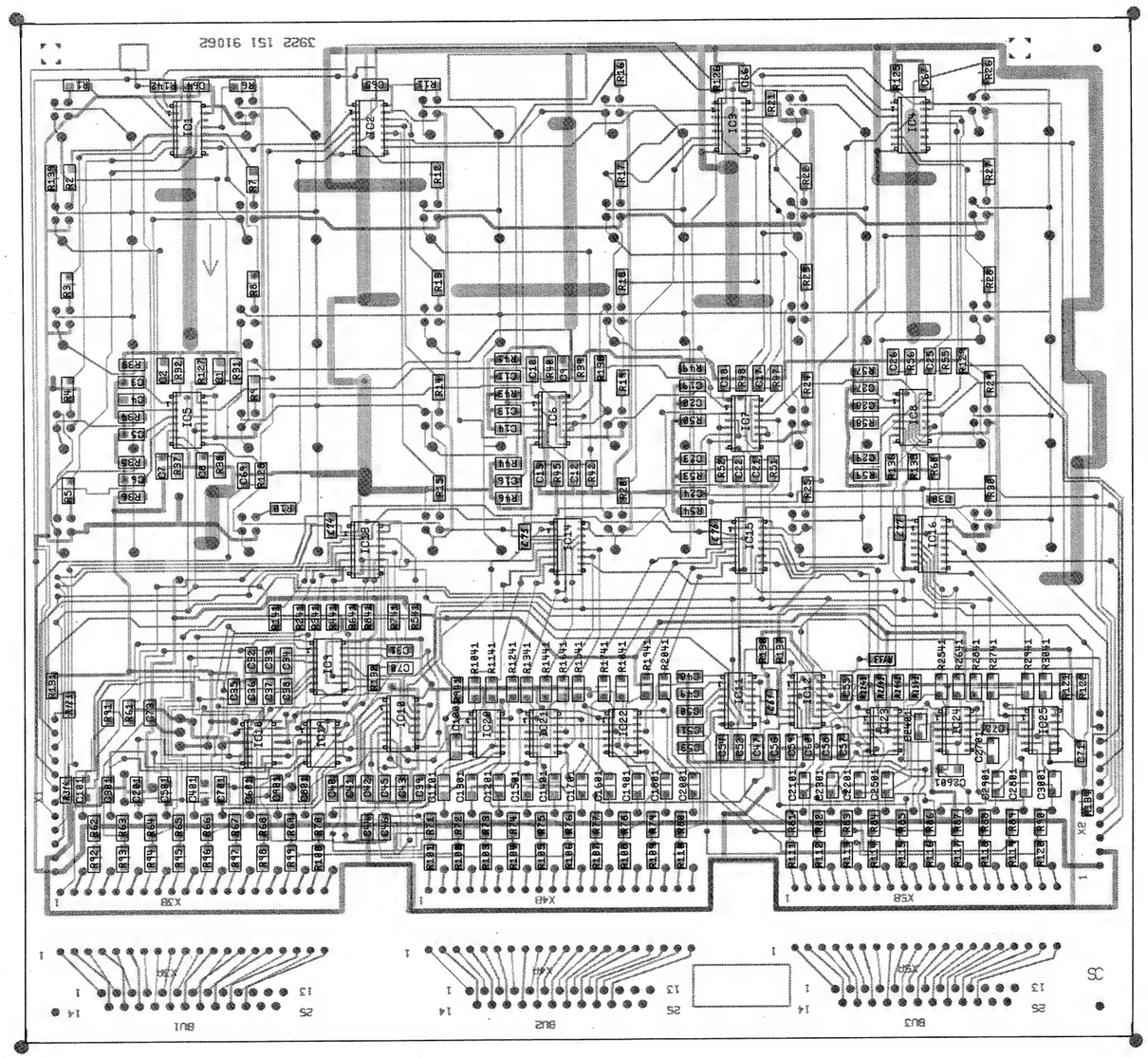
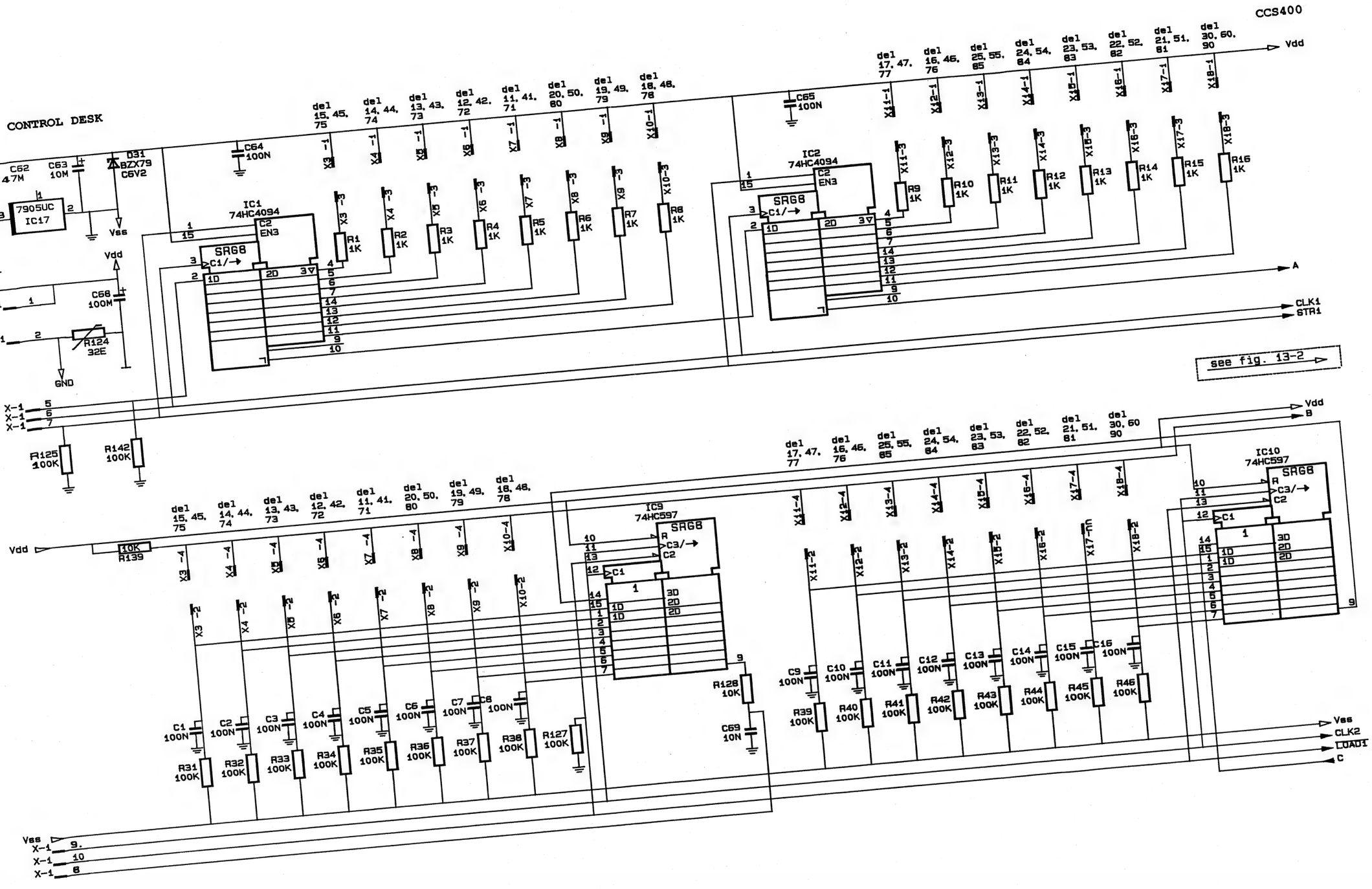


FIG. 12-2 ASSEMBLY DIAGRAM OF LBB 3386/02, BOTTOM SIDE

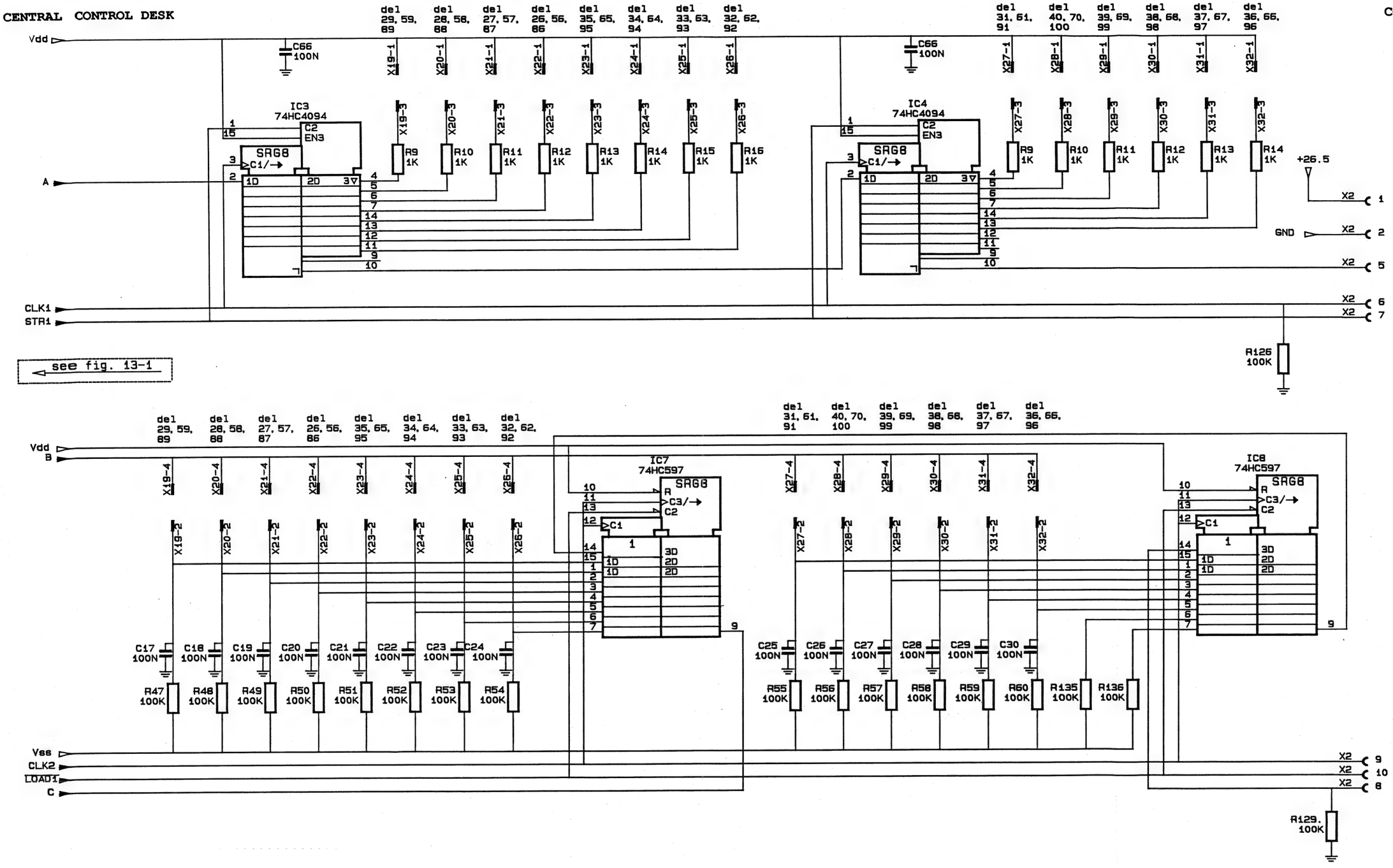
CENTRAL CONTROL DESK



POWER SUPPLY CONNECTIONS		
I.C 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	Pt.8 connected to	(V+) -5V
	Pt.16	V+
I.C 18, 19, 20, 21, 22, 23, 24, 25	Pt.4	V+
	Pt.11	⊥

FIG. 13-1 CIRCUIT DIAGRAM OF LBB 3386/02

CENTRAL CONTROL DESK



POWER SUPPLY CONNECTIONS		
I.C 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	Pt.8 connected to	"(V+) -5V"
"	Pt.16	" " V+ "
I.C 18, 19, 20, 21, 22, 23, 24, 25	Pt.4	" " V+ "
"	Pt.11	" " ⊥ "

FIG. 13-2 CIRCUIT DIAGRAM OF LBB 3386/02

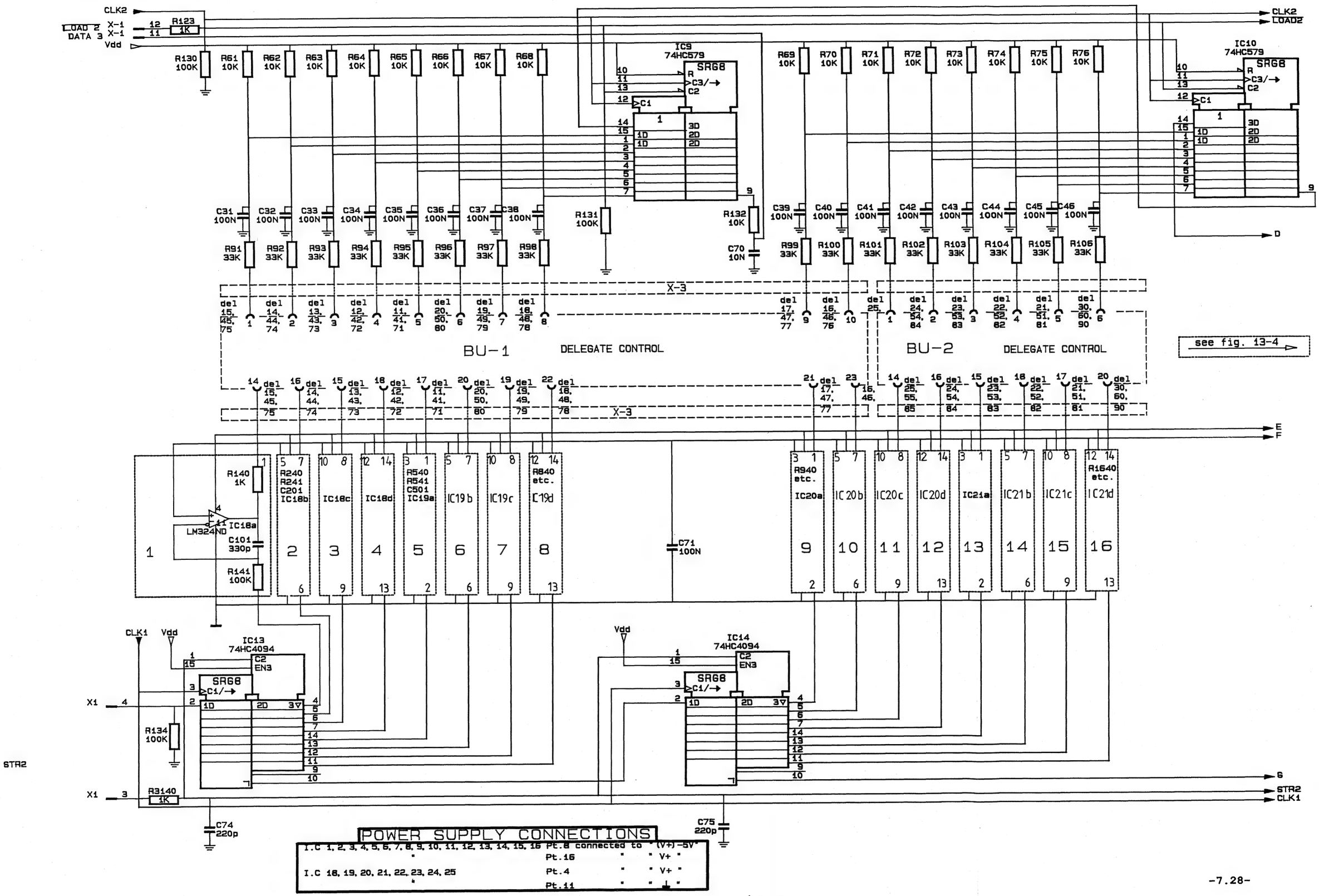


FIG. 13-3 CIRCUIT DIAGRAM OF LBB 3386/02

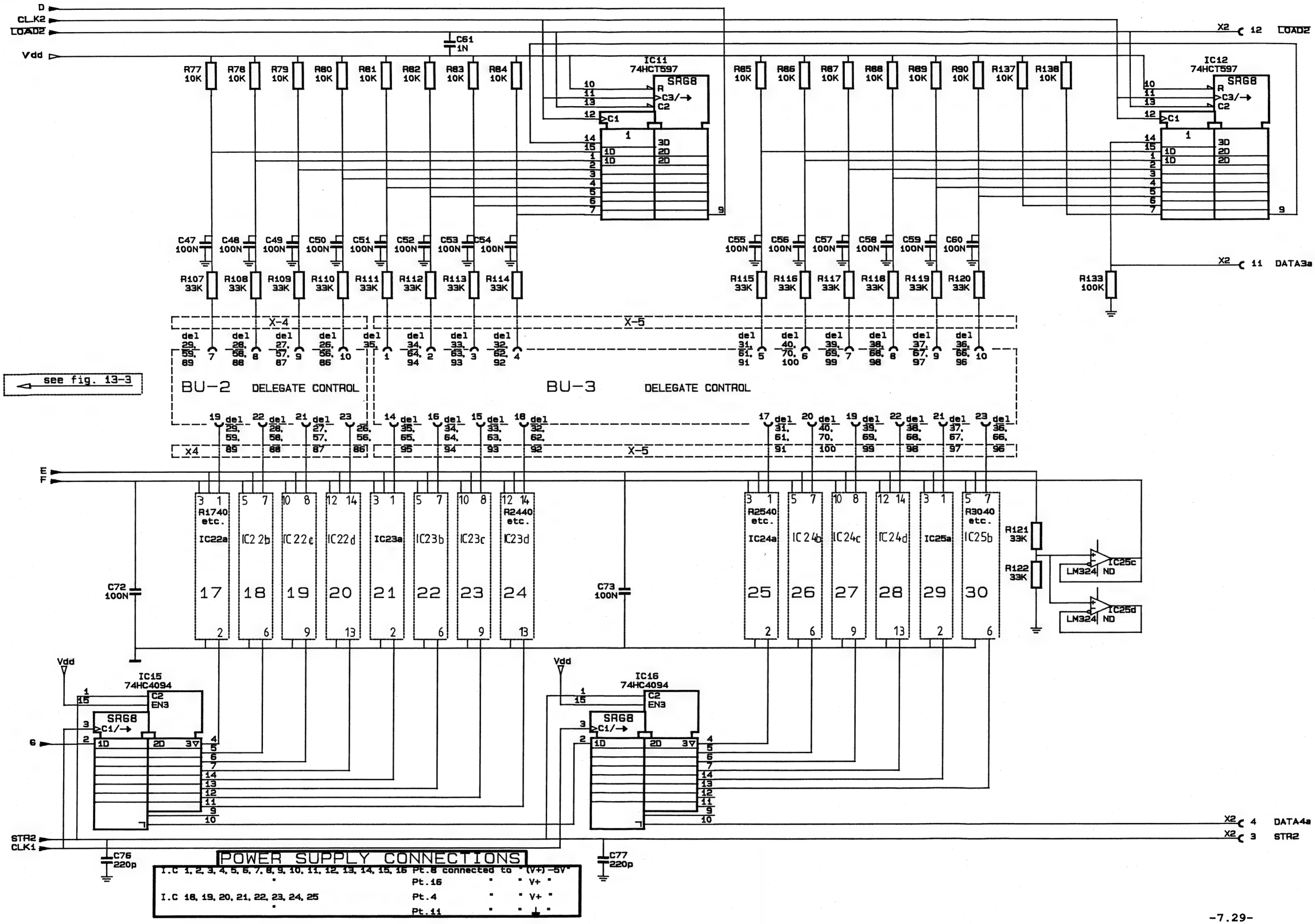
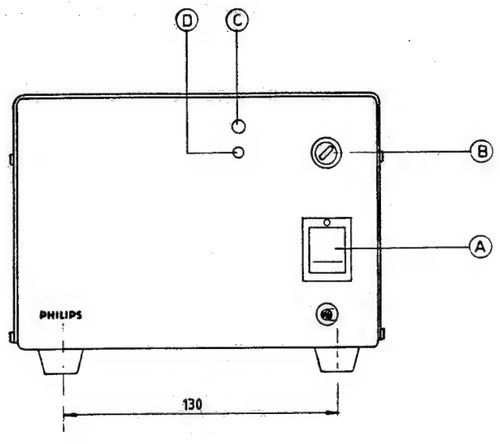
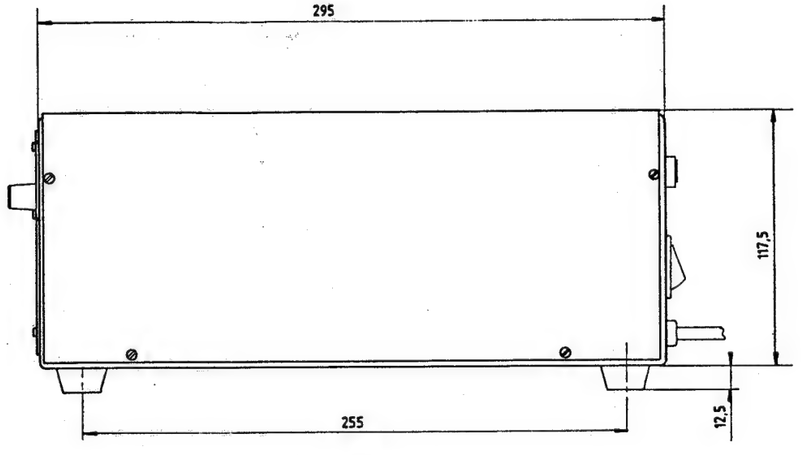
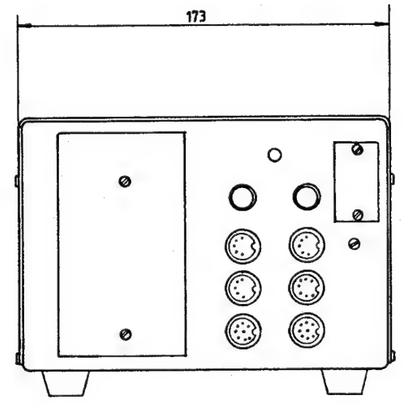


FIG. 13-4 CIRCUIT DIAGRAM OF LBB 3386/02

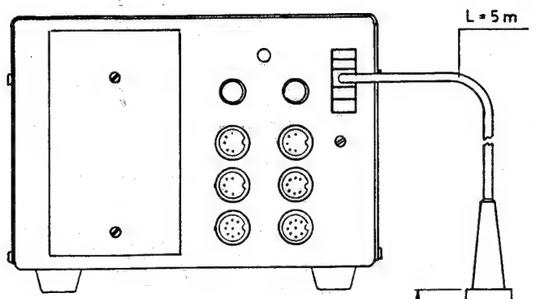
CENTRAL SUPPLY UNIT



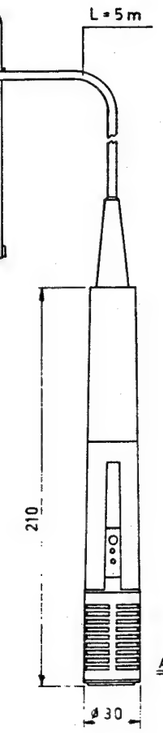




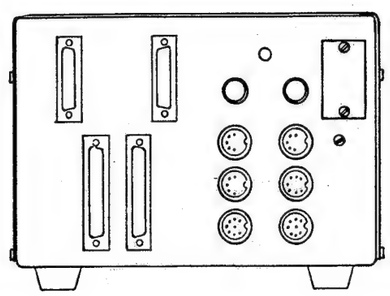
LBB 3300/00



LBB 3300/05

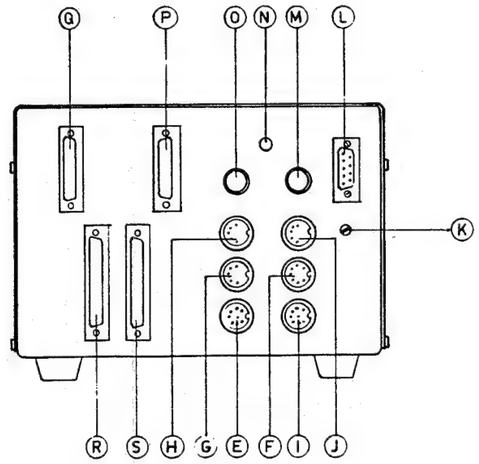


ALSO FOR LBB 3300/30/35



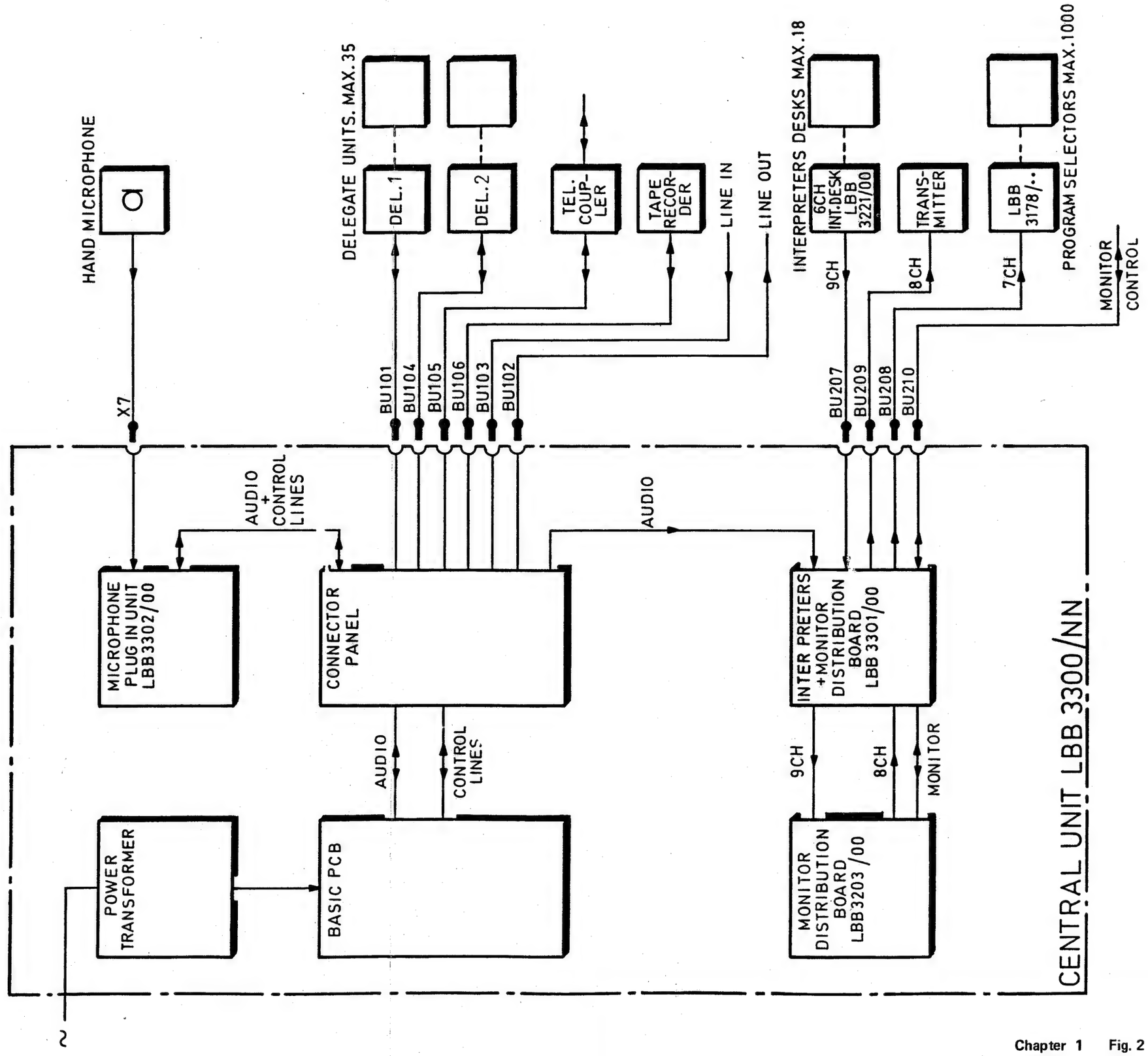
LBB 3300/20/25

CASING MATERIAL: STEEL SHEET
COLOUR: BROWN 30233
WEIGHT: 4,5 KG
PACKAGING DIMENSIONS: 440 x 255 x 215
GROSS WEIGHT: 5,3 KG

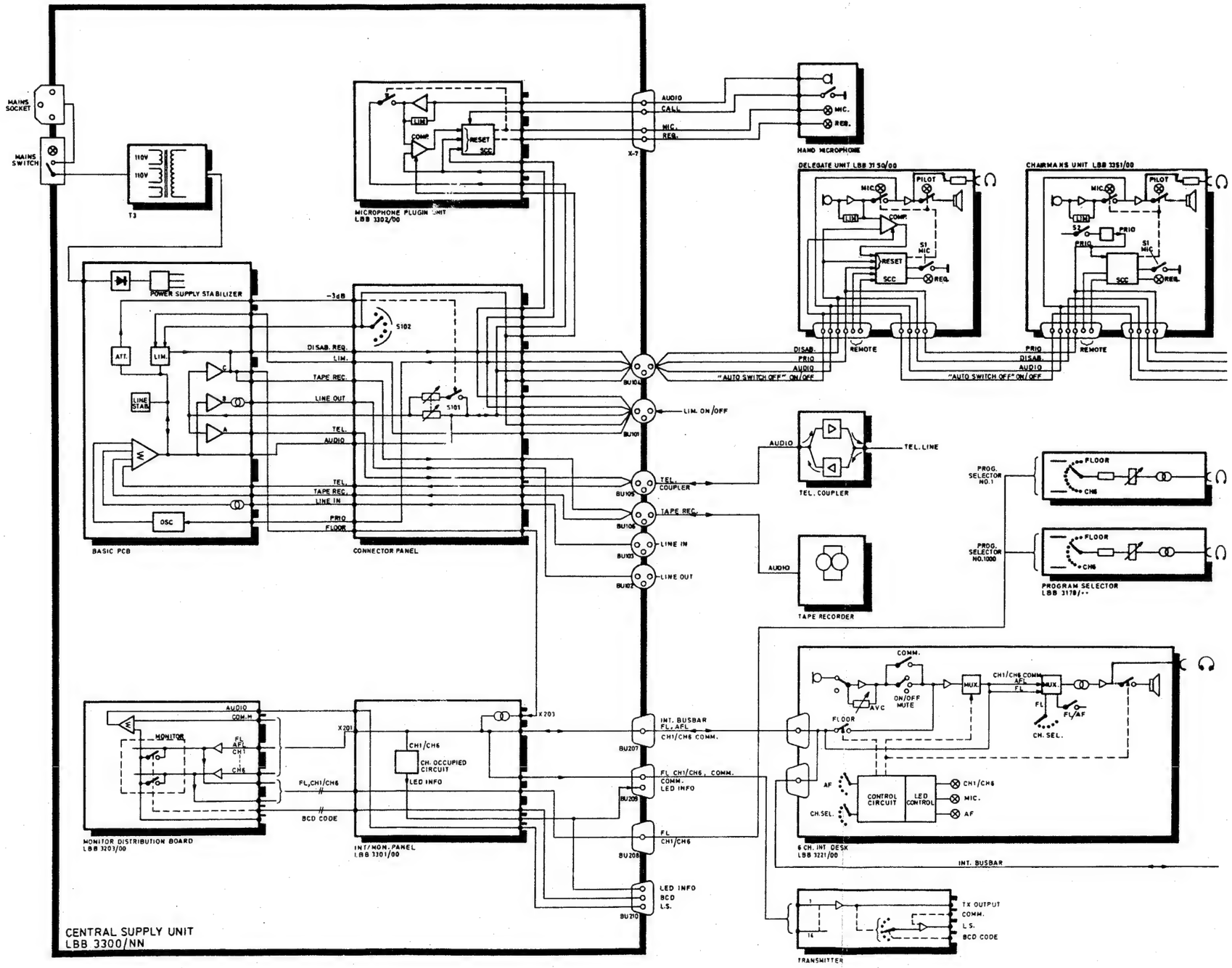


LBB 3300/30/35

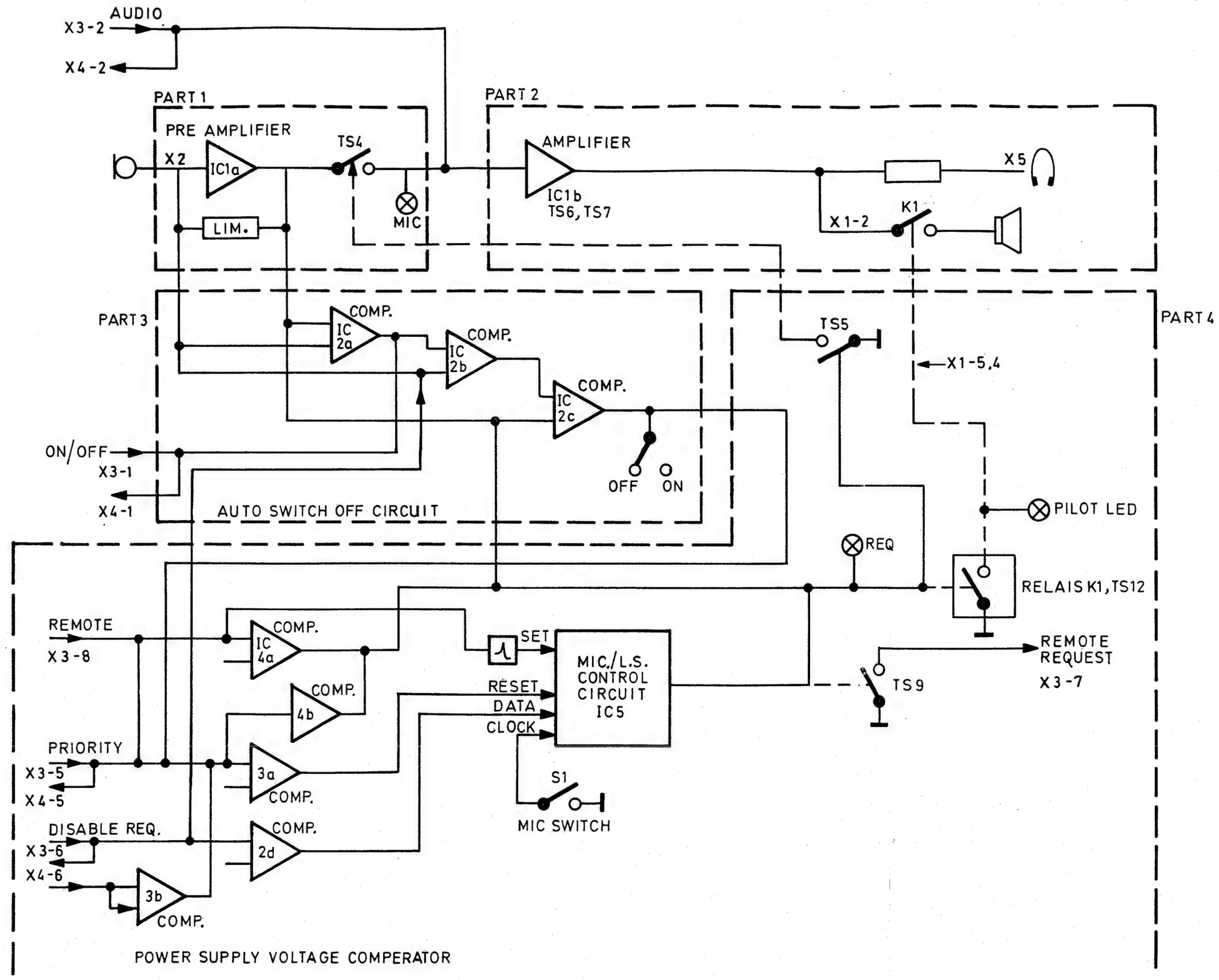
SYSTEM BLOCK DIAGRAM C.S.U.



DETAILED BLOCK DIAGRAM C.S.U. AND PERIPHERALS



DETAILED BLOCK DIAGRAM OF DELEGATE UNIT



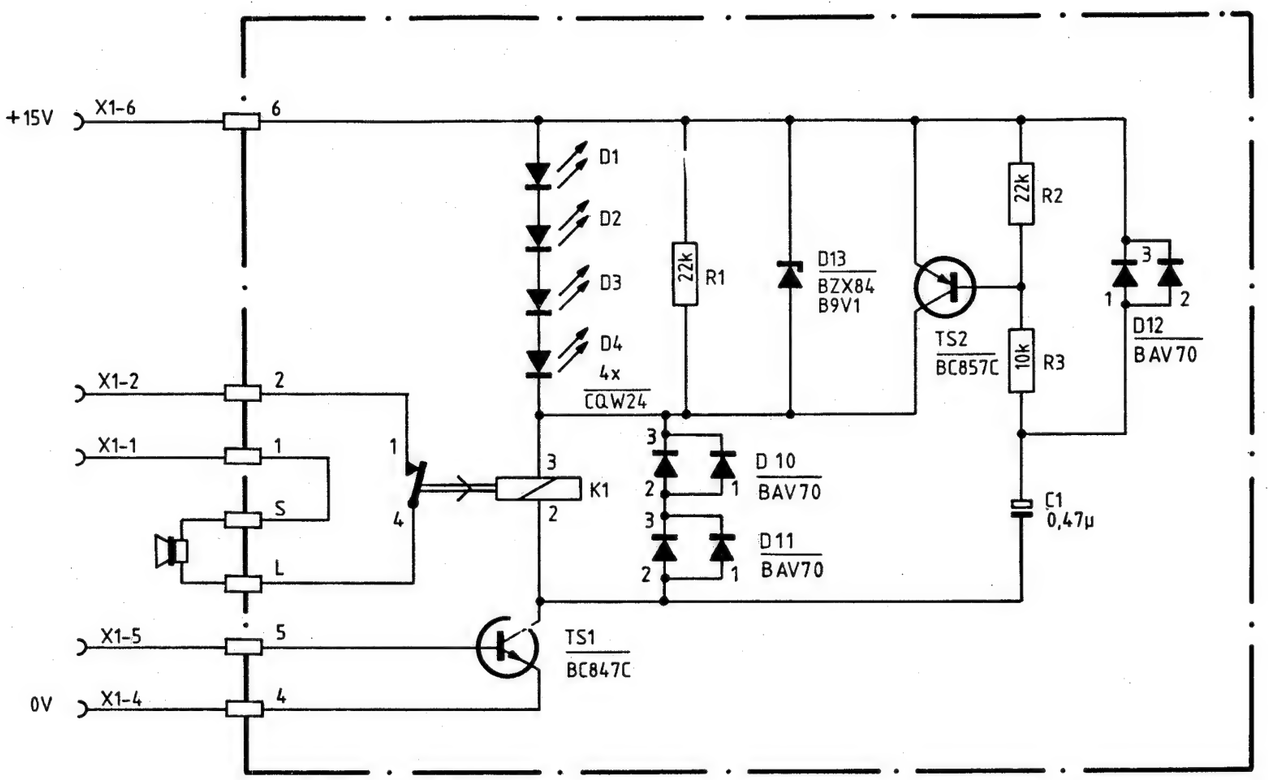
CIRCUIT DIAGRAM OF DELEGATE UNIT

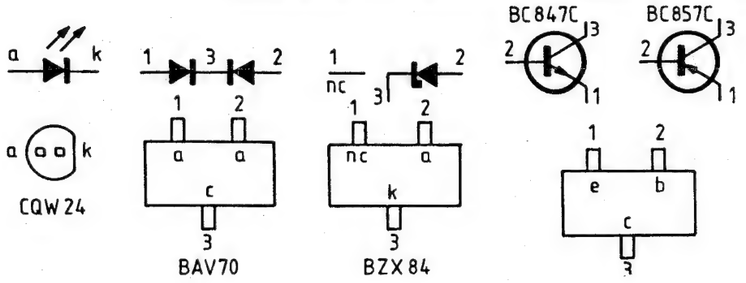
NO	TYPE	+V	+15	⊥
1	LF353N	8		4
2	LM324DFP		4	11
3-4	LM393FP	8		4
5	MEF4019BT		16	7
6	UA741CFP		7	14

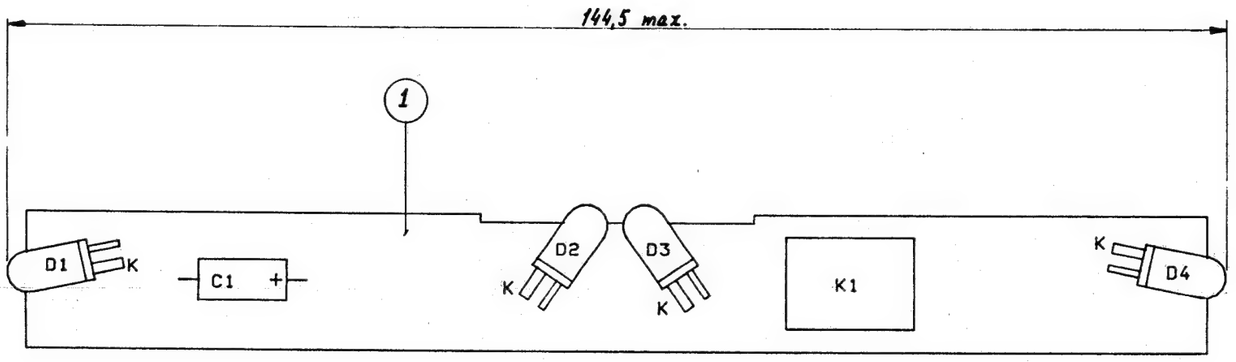
TOP VIEW

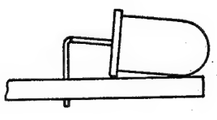
NOT USED

FLOOR X10-3 X11-3
GROUND REFERENCE OF LOUDN X10-4 X11-4
REMOTE X10-5
PRIORITY X10-1 X11-1
DISABLE REQ X10-2 X11-2
FRONT PANEL X10-7 X11-7 +V
X10-8 X11-8









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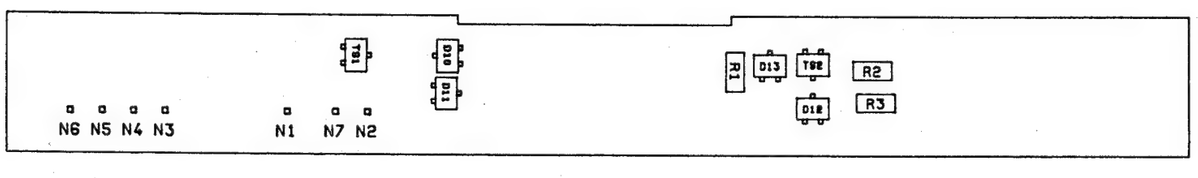
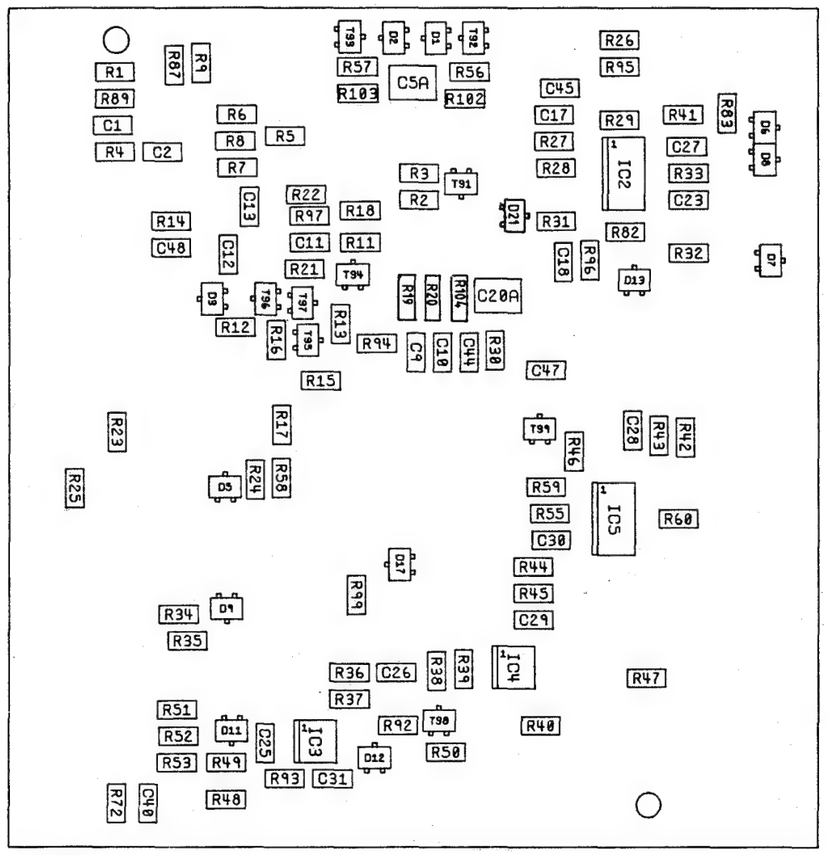
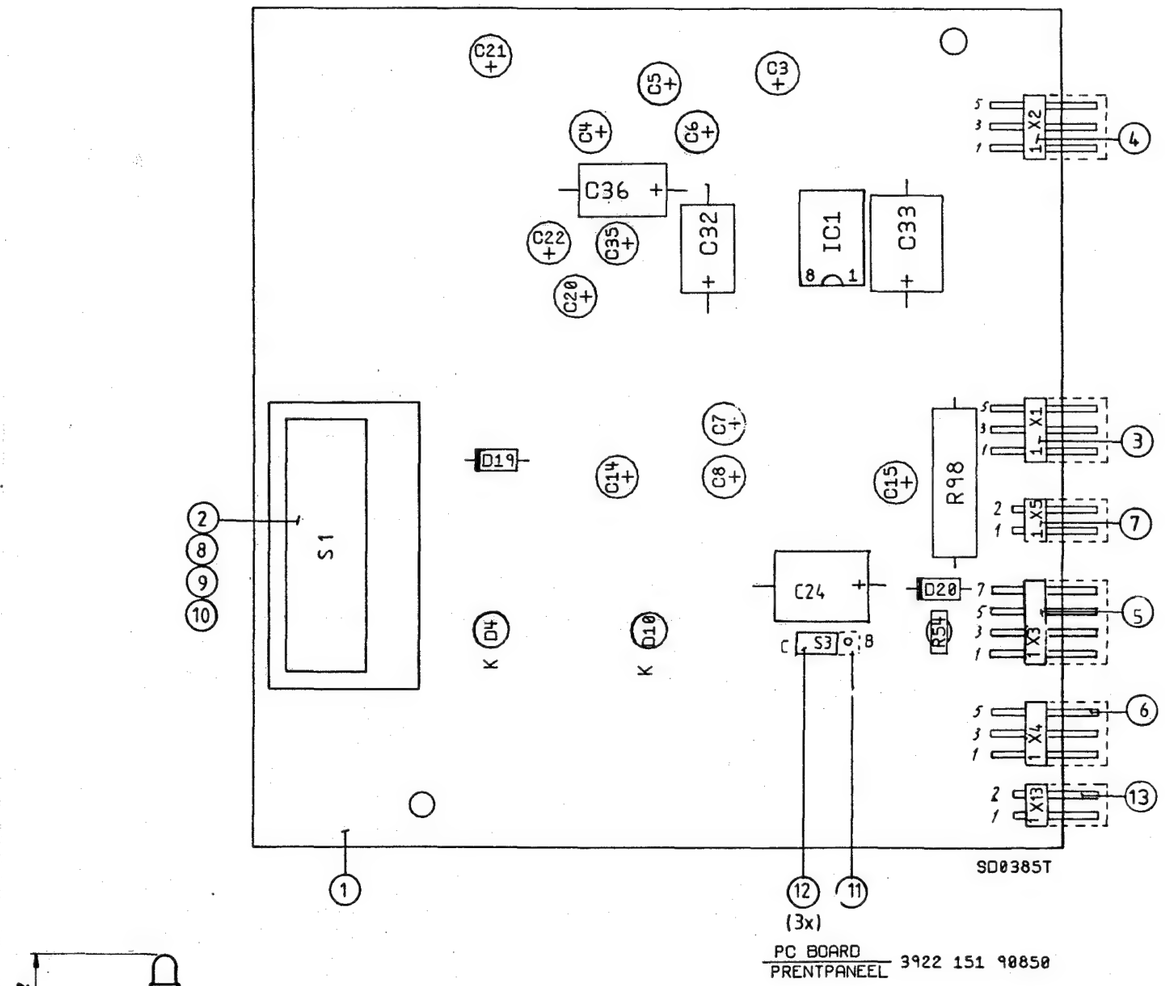
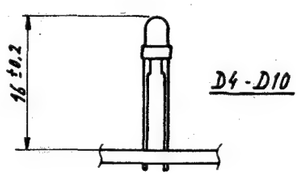
PRENTPANEEL 3922 151 91000



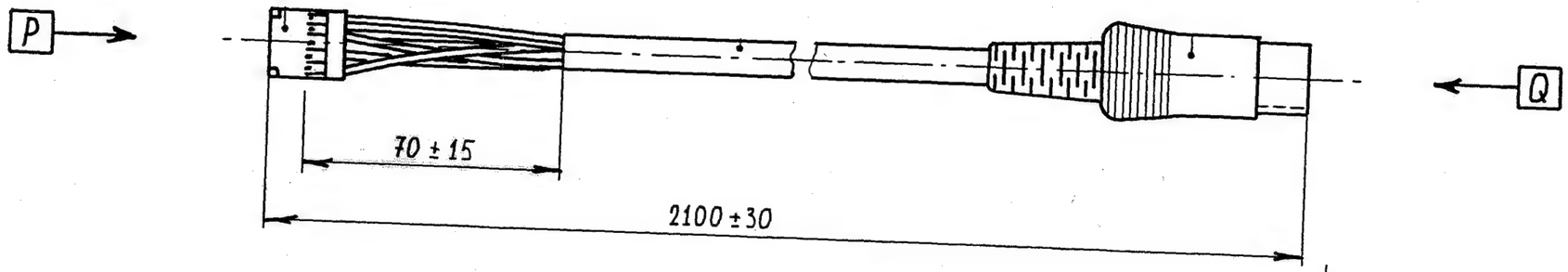
LOCATION OF COMPONENTS OF DELEGATE UNIT

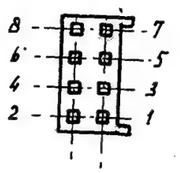


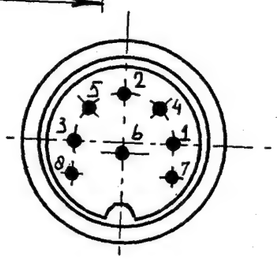




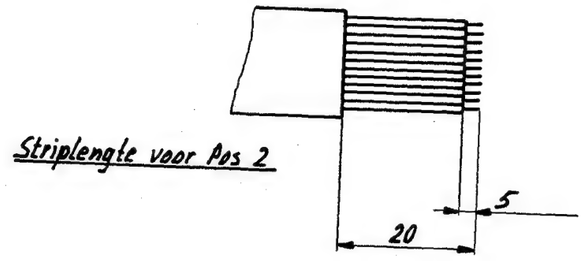
CONNECTIONS, DELEGATE UNIT CABLE ASSEMBLY

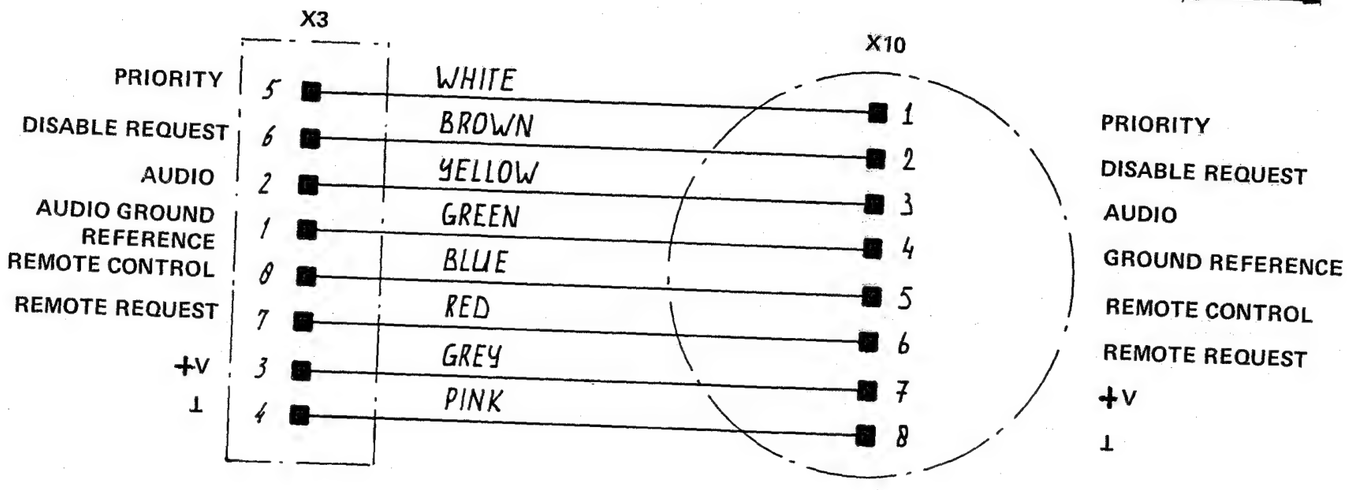




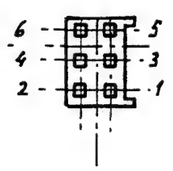


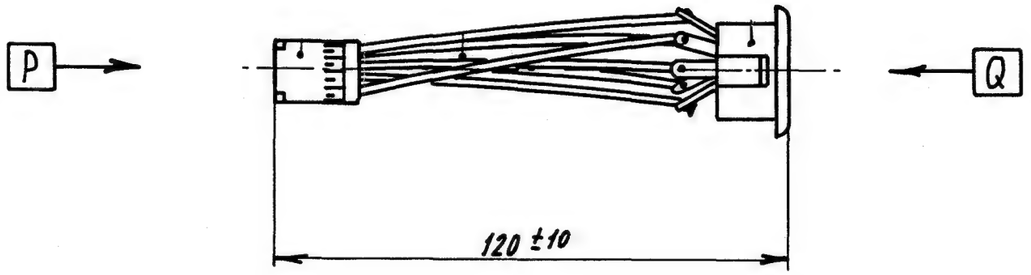
P SCHAAL 2:1

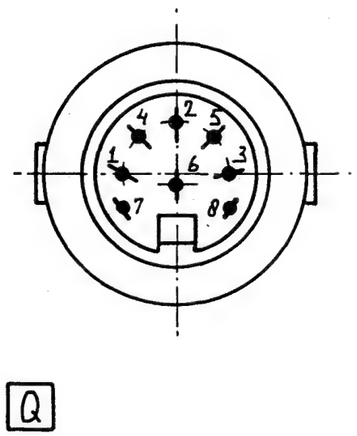


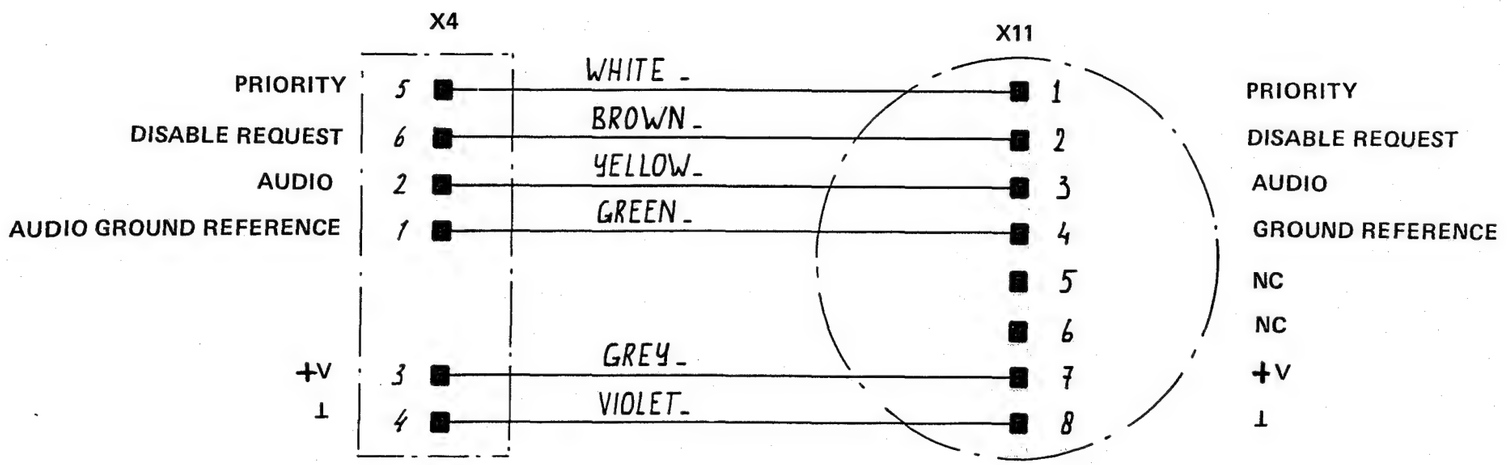


CONNECTIONS, DELEGATE UNIT CABLE ASSEMBLY INSIDE

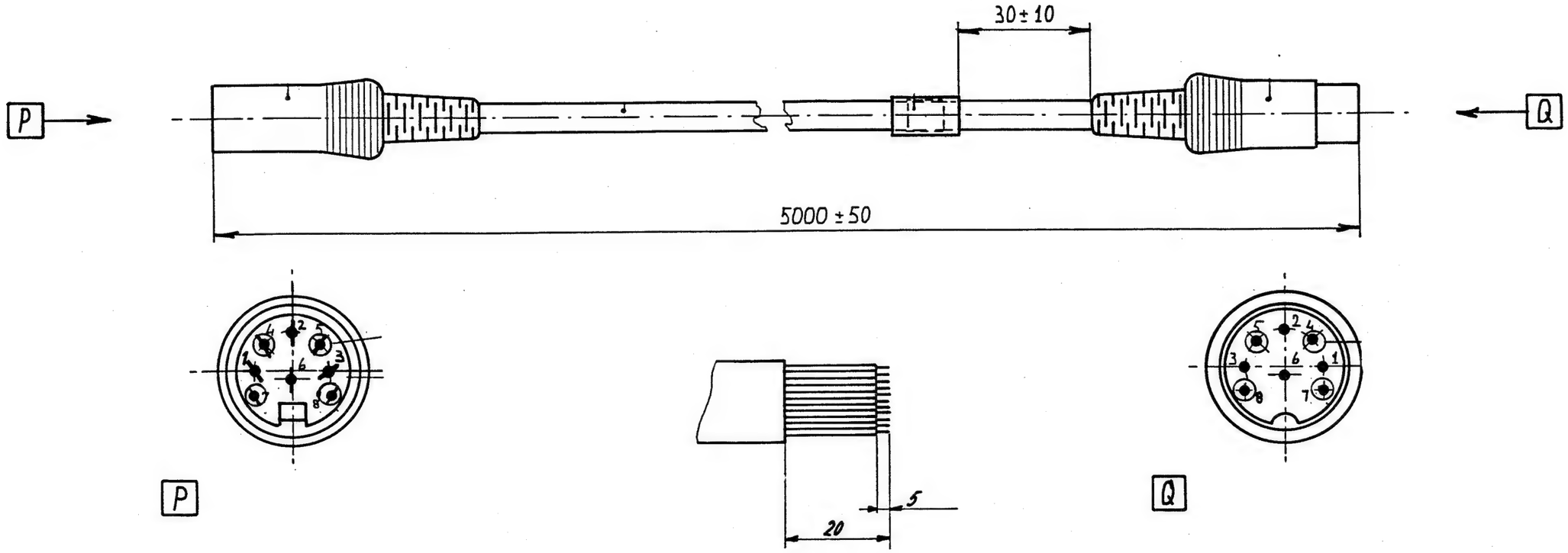


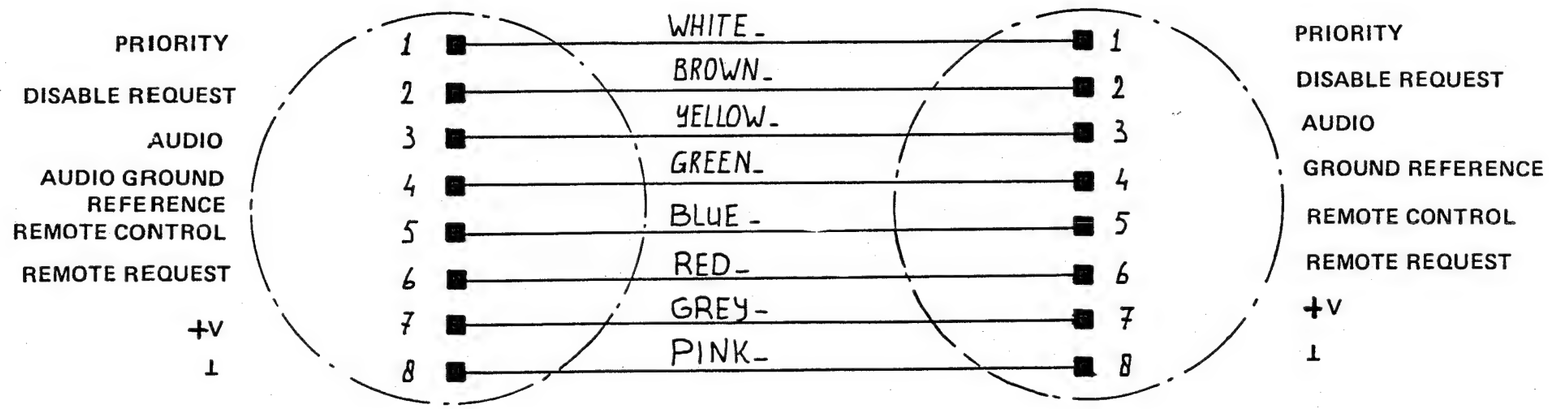




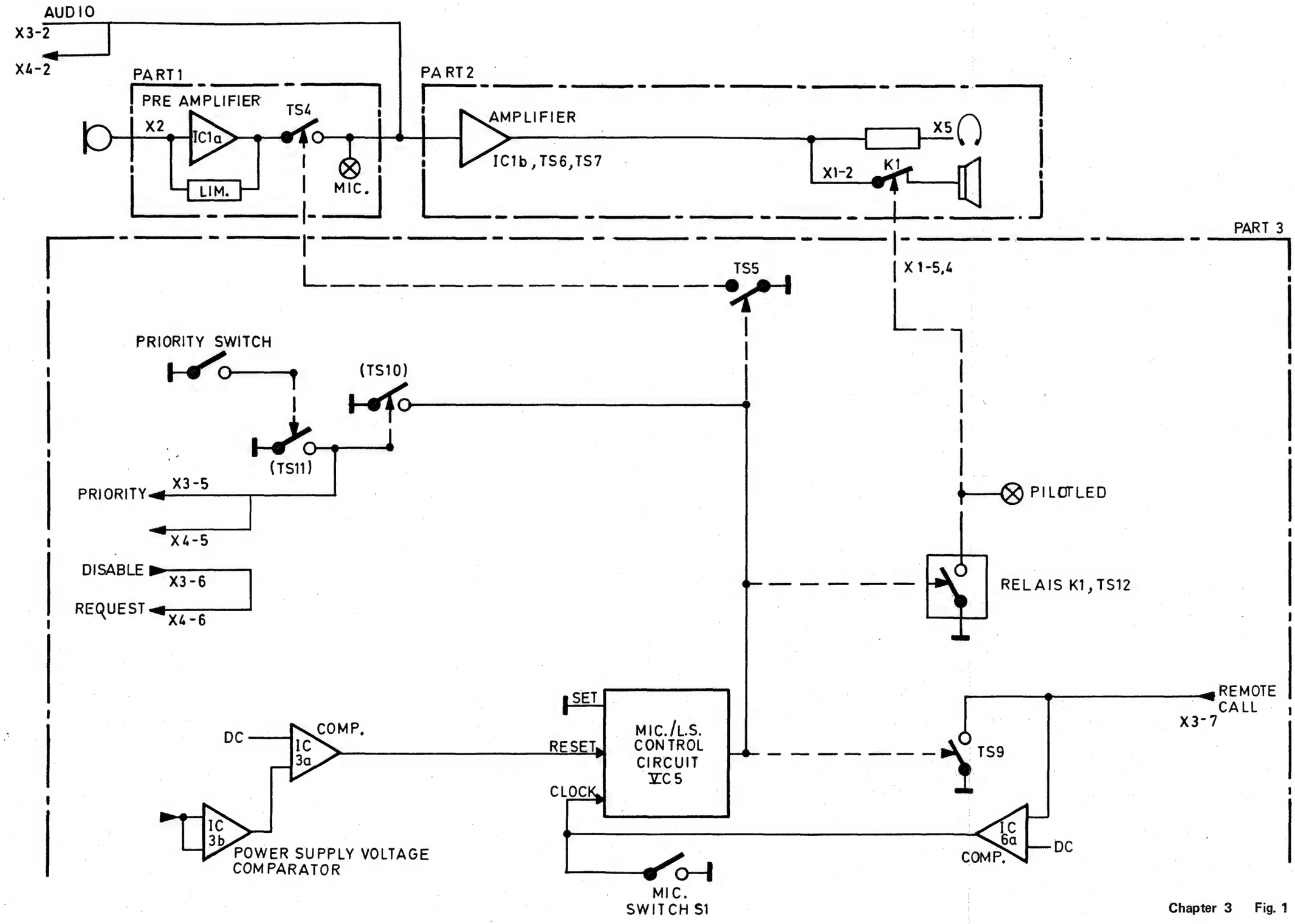


EXTENSION CABLE LBB 3305/00

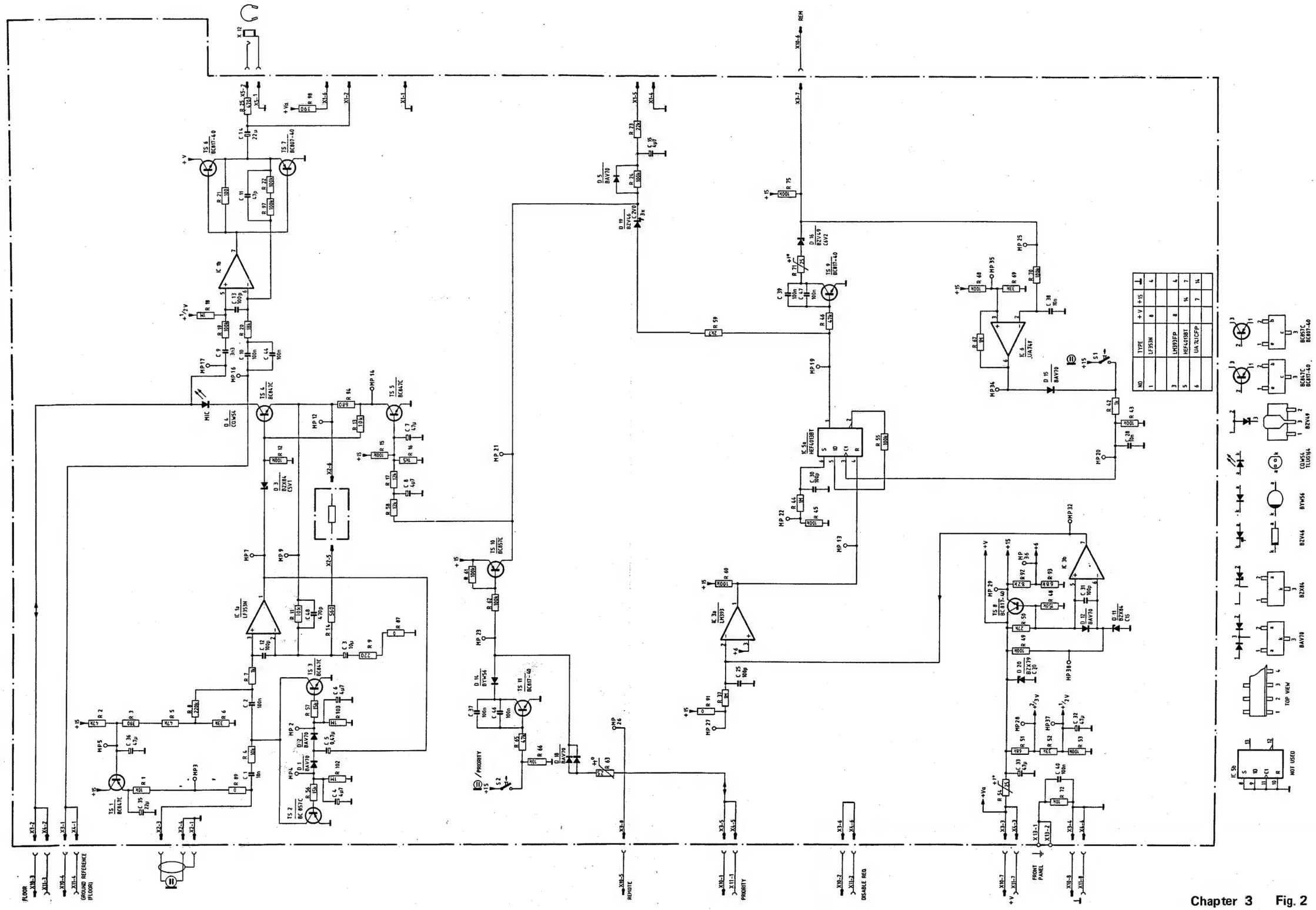




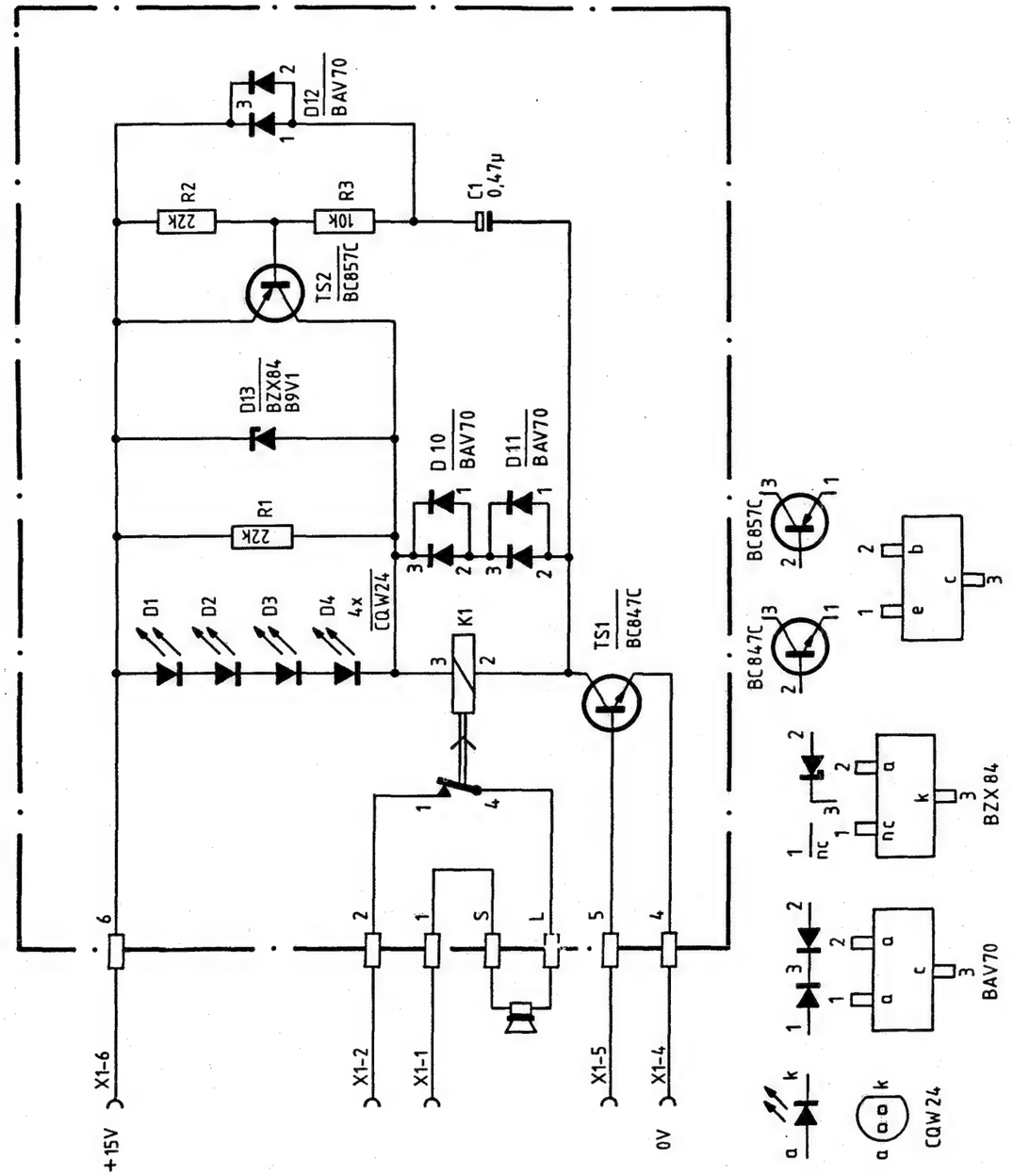
DETAILED BLOCK DIAGRAM OF CHAIRMANS UNIT

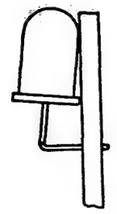


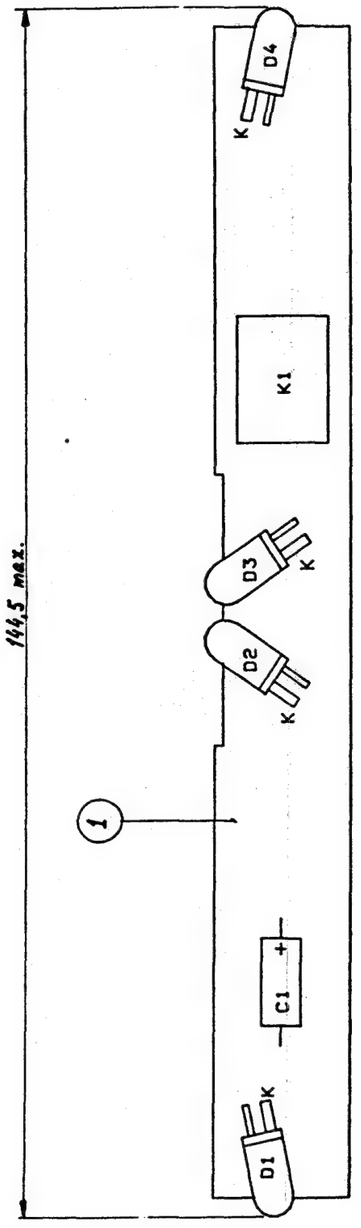
CIRCUIT DIAGRAM OF CHAIRMANS UNIT



CIRCUIT DAIGRAM AND LOCATION OF COMPONENTS LOUDSPEAKER







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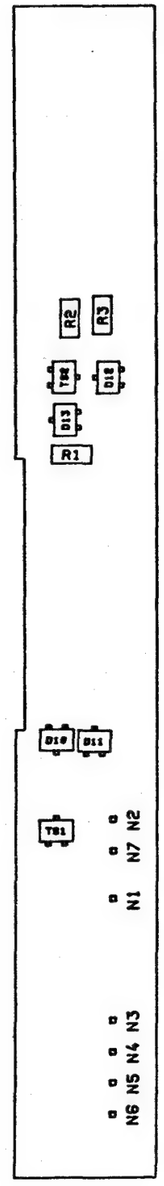
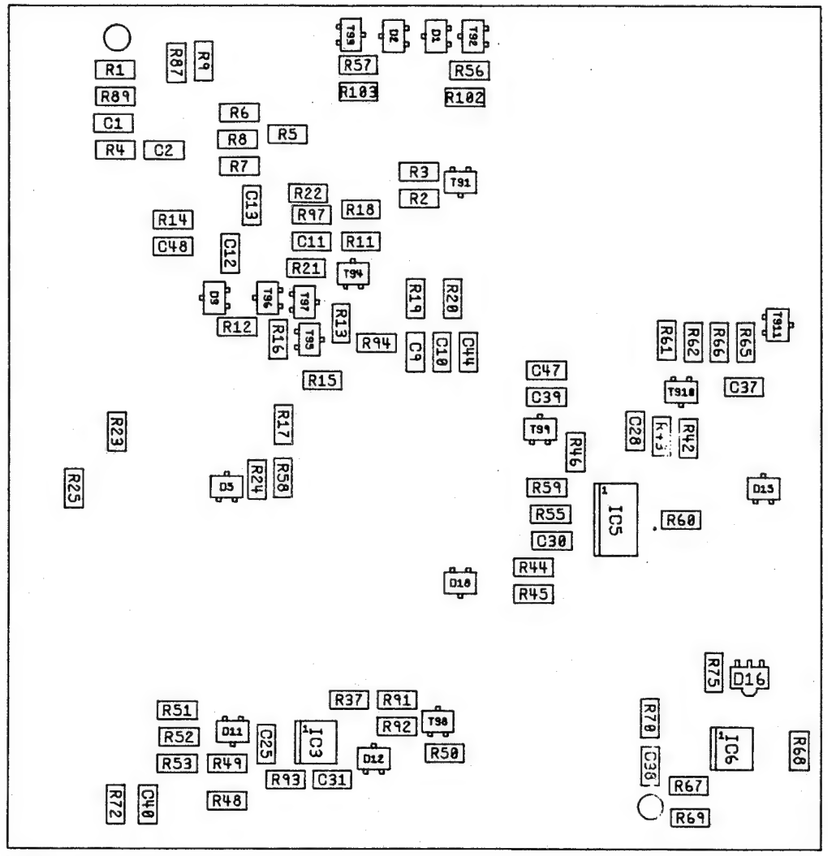
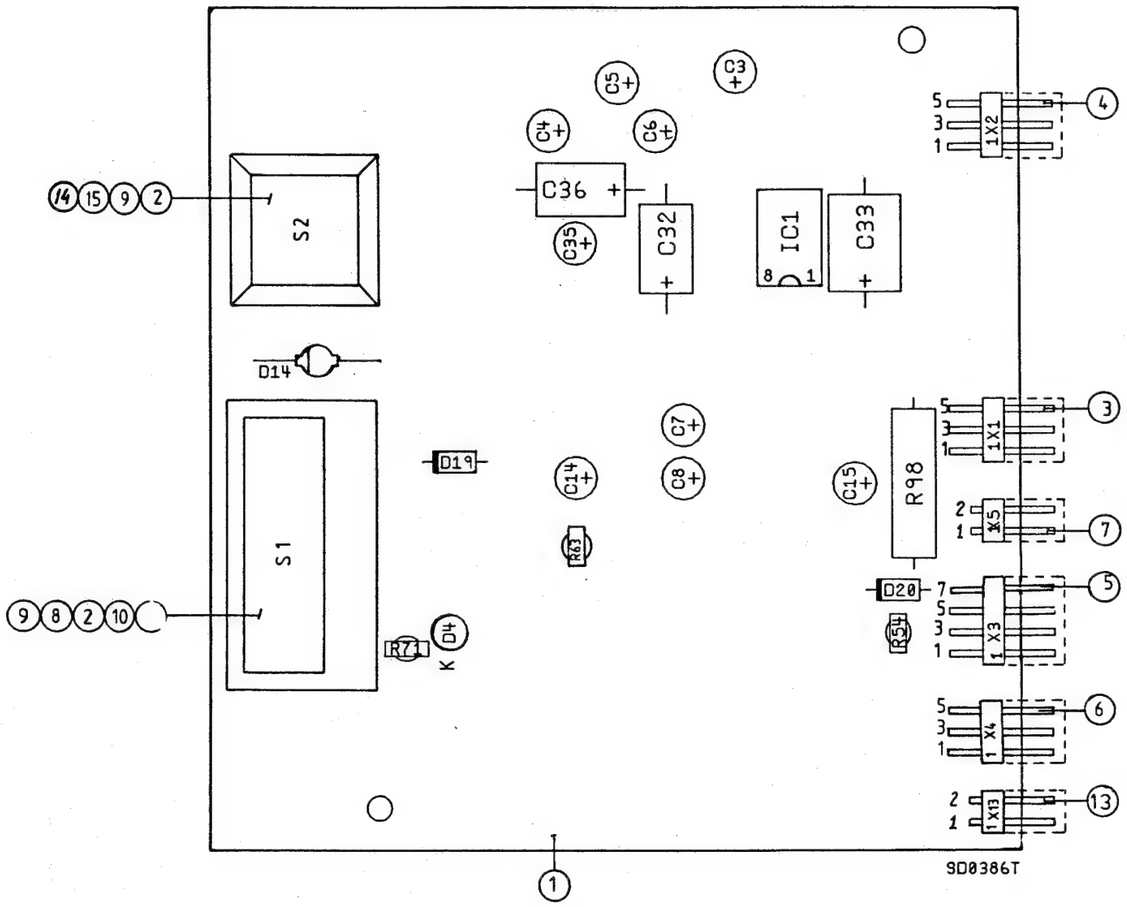


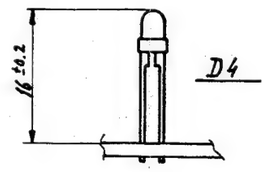
LOCATIONS OF COMPONENTS OF CHAIRMANS UNIT



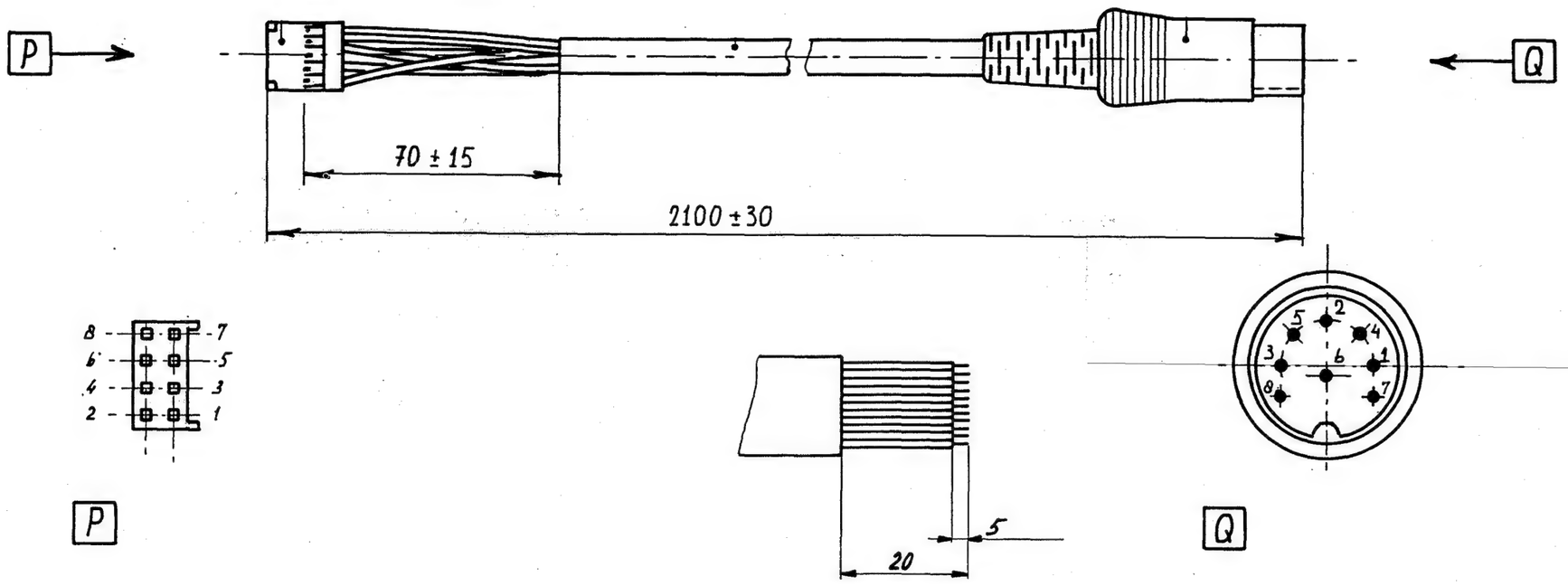
9D0386B

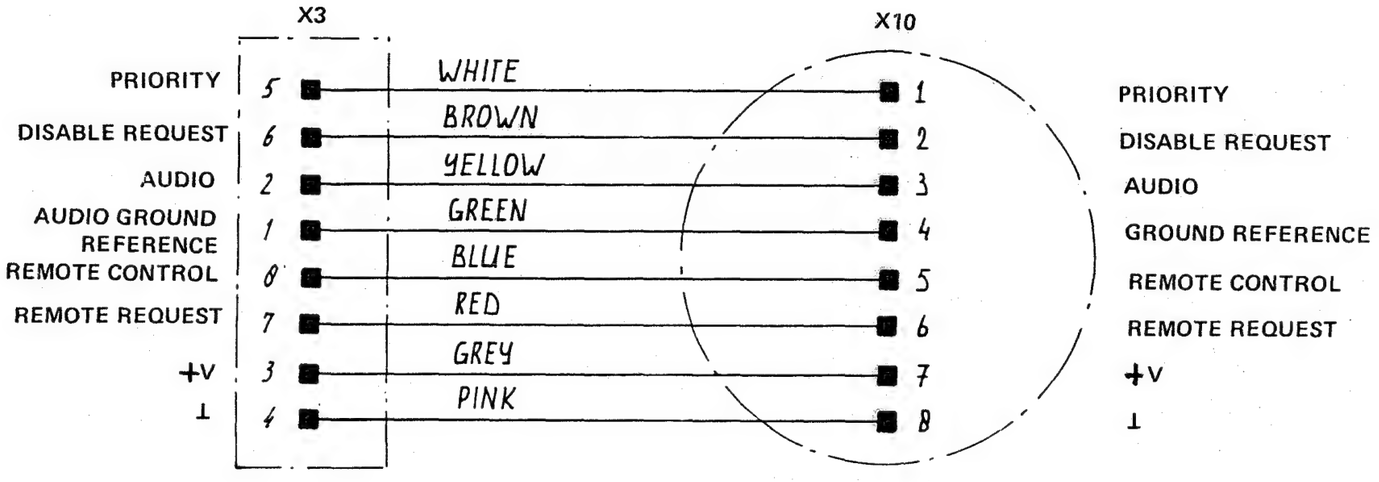


PC BOARD
PRENTPANEEL 3922 151 90850

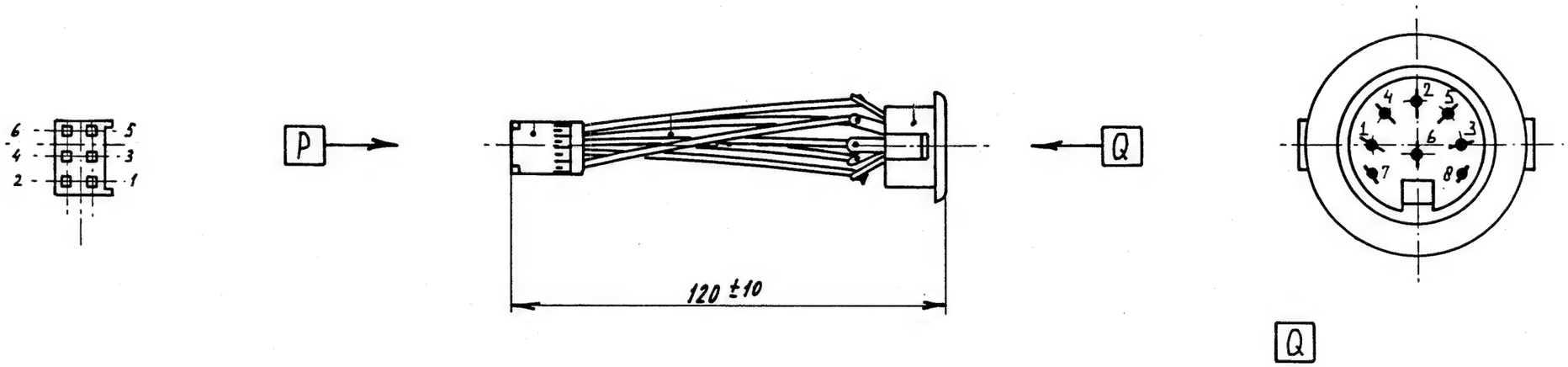


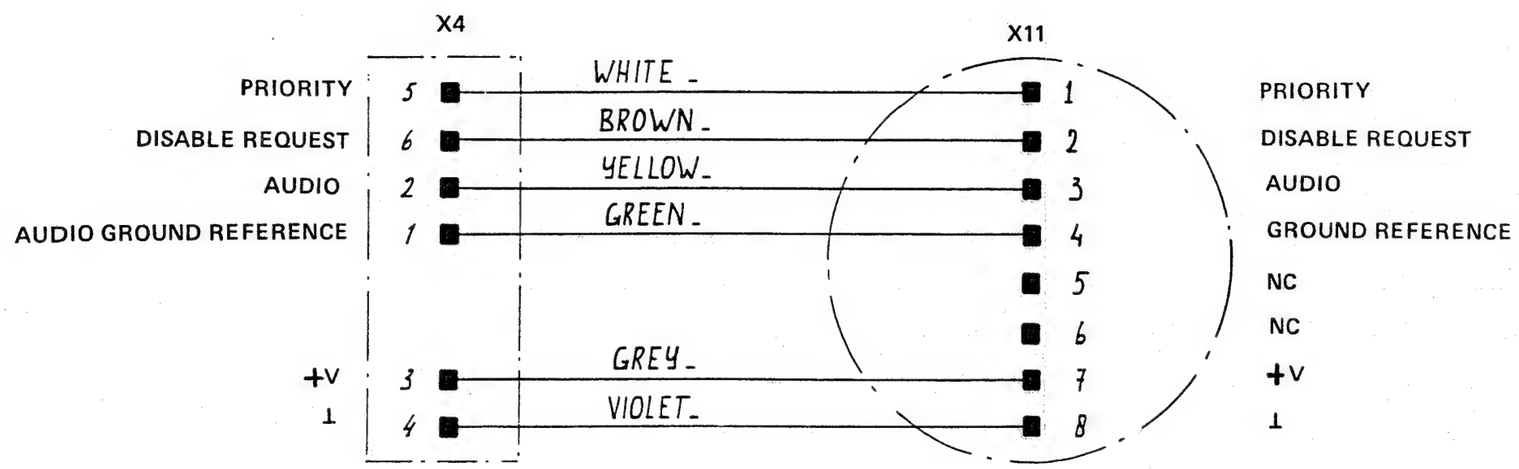
CONNECTIONS, CHAIRMANS UNIT CABLE ASSEMBLY



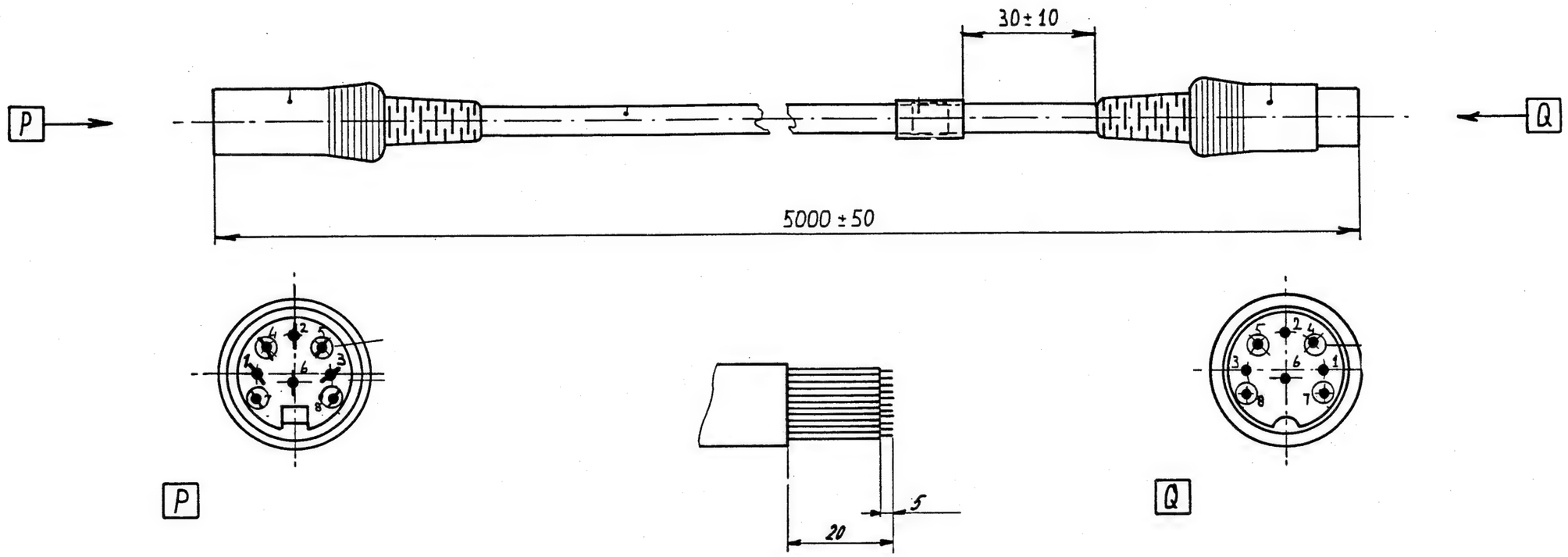


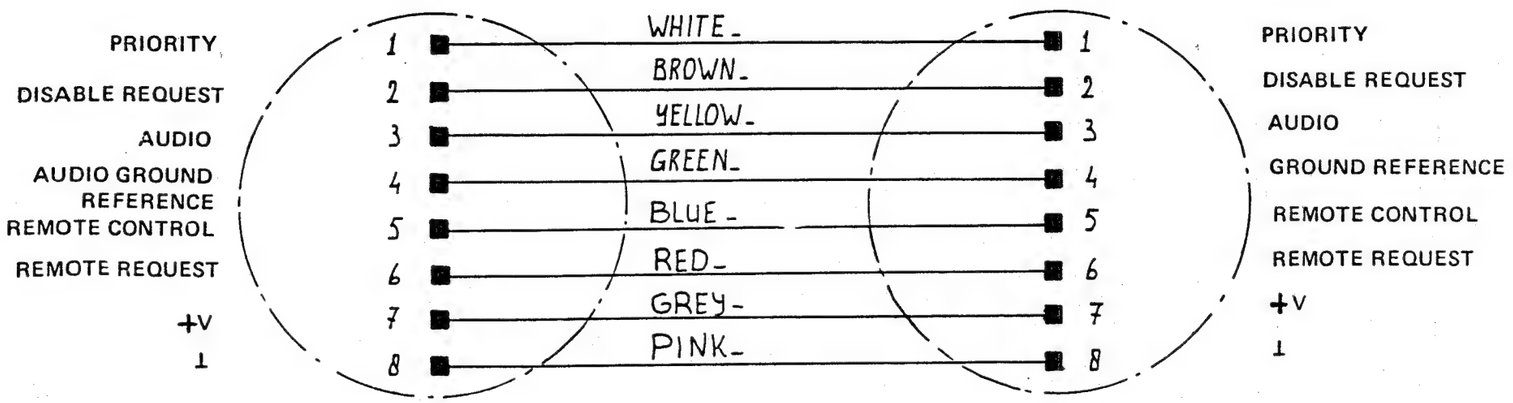
CONNECTIONS, CHAIRMANS UNIT CABLE ASSEMBLY INSIDE



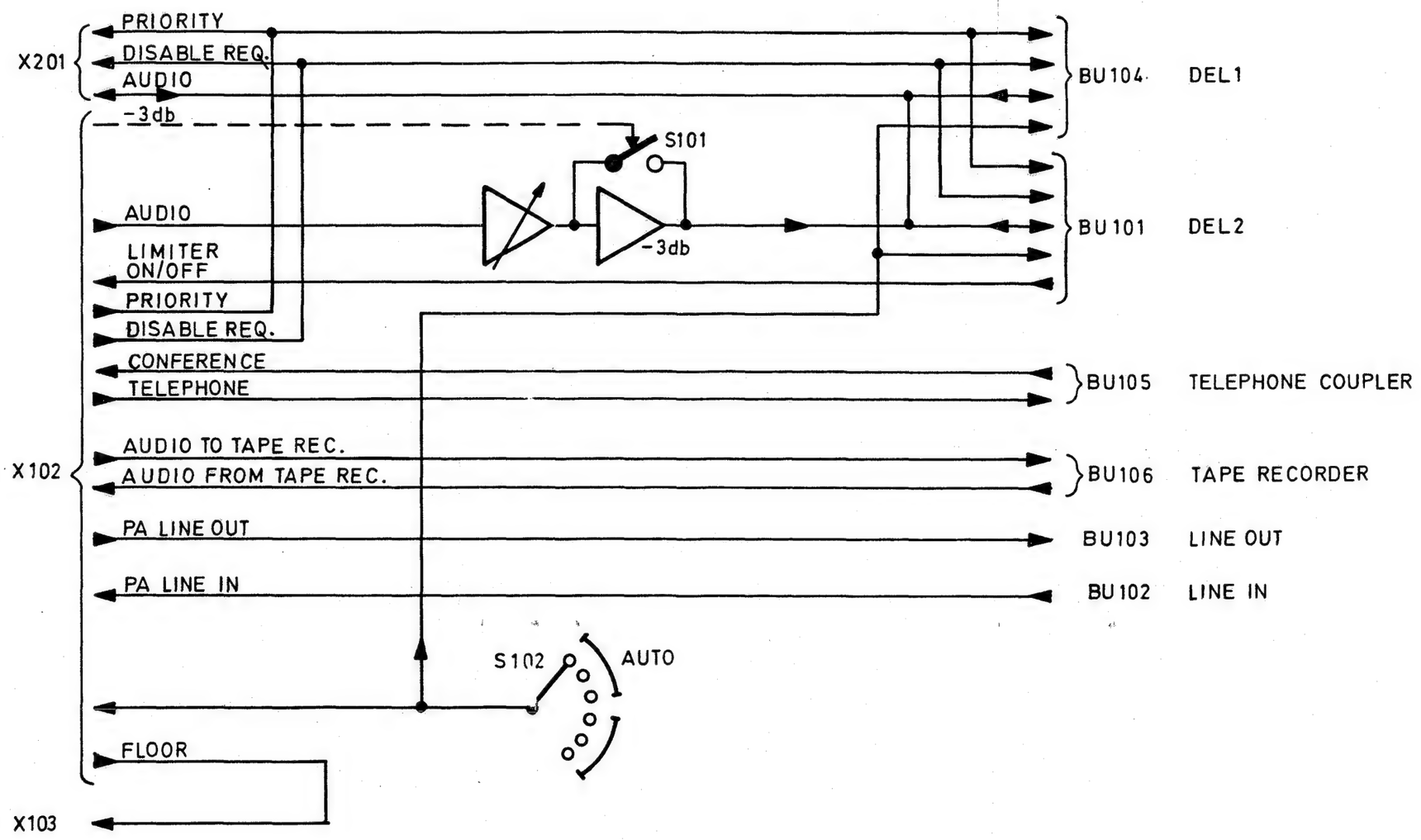


EXTENSION CABLE LBB 3305/00

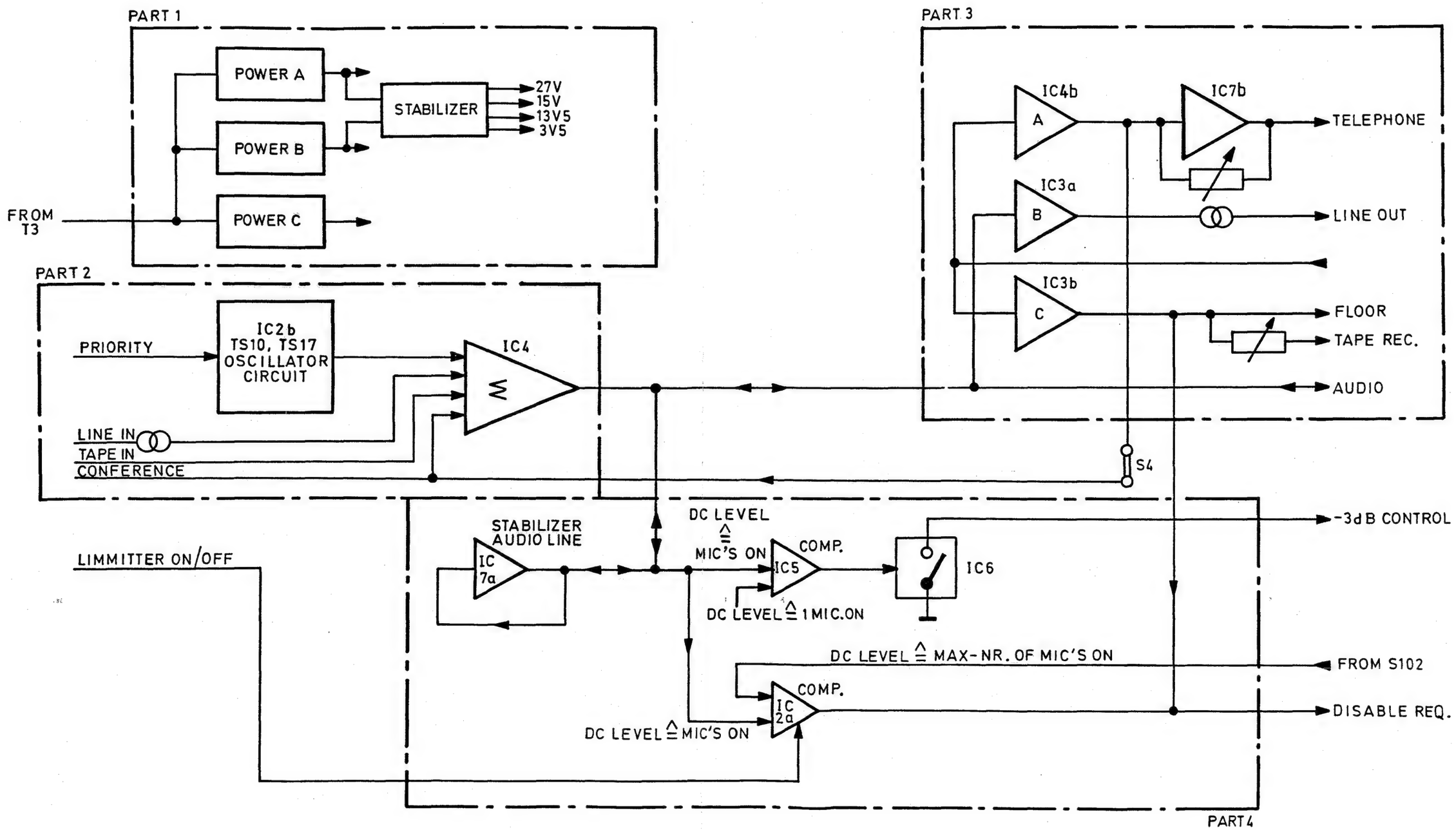




DETAILED BLOCK DIAGRAM CONNECTOR PANEL



DETAILED BLOCK DIAGRAM BASIC P.C.B.



CIRCUIT DIAGRAM CONNECTOR PANEL AND BASIC P.C.B.

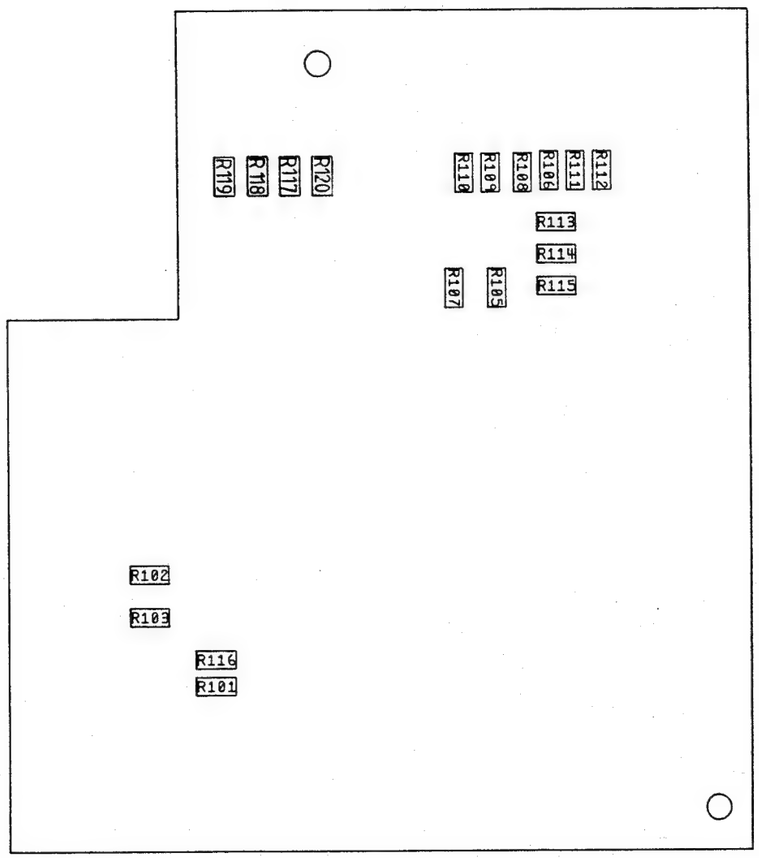
IC NO	TYPE	+27	+15	⏚
2	MC 1458	8		4
4	LF353N		8	4
5	TDB0156DP8		8	4
6	HEF 4066		14	7
7-3	LF353N	8		4

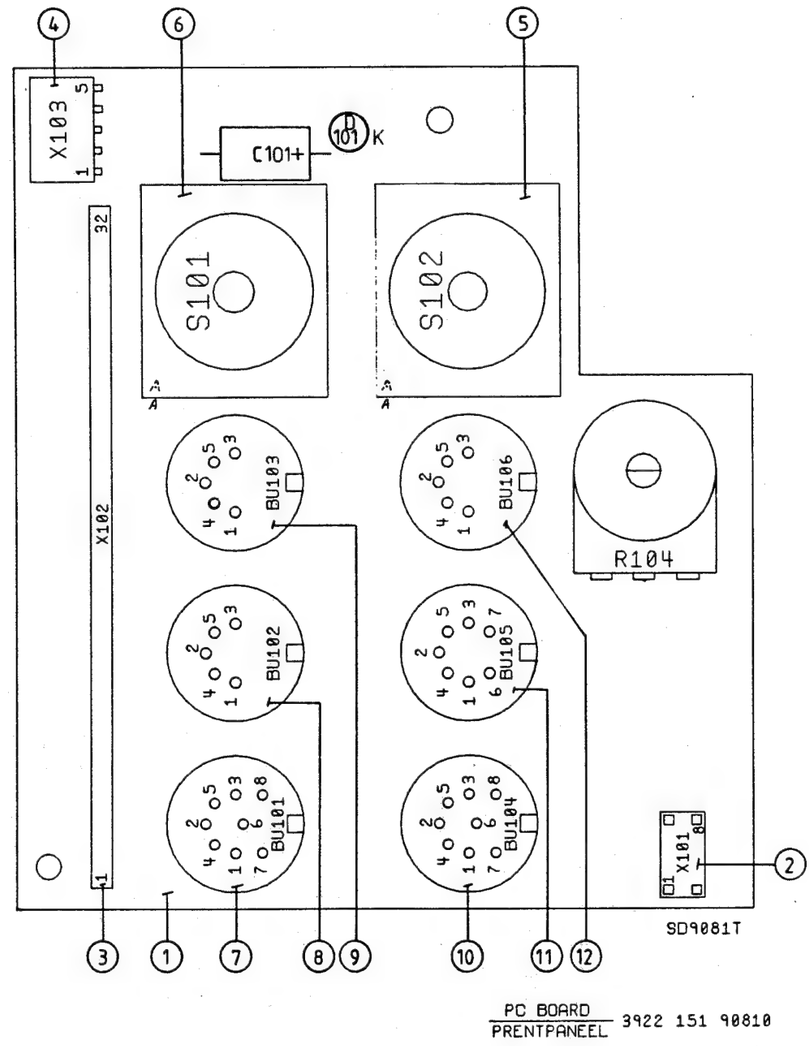
PCB CONTRIBUTION 3922 156 03910

PCB BASIC 3922 156 03900

Chapter 4 Fig. 3

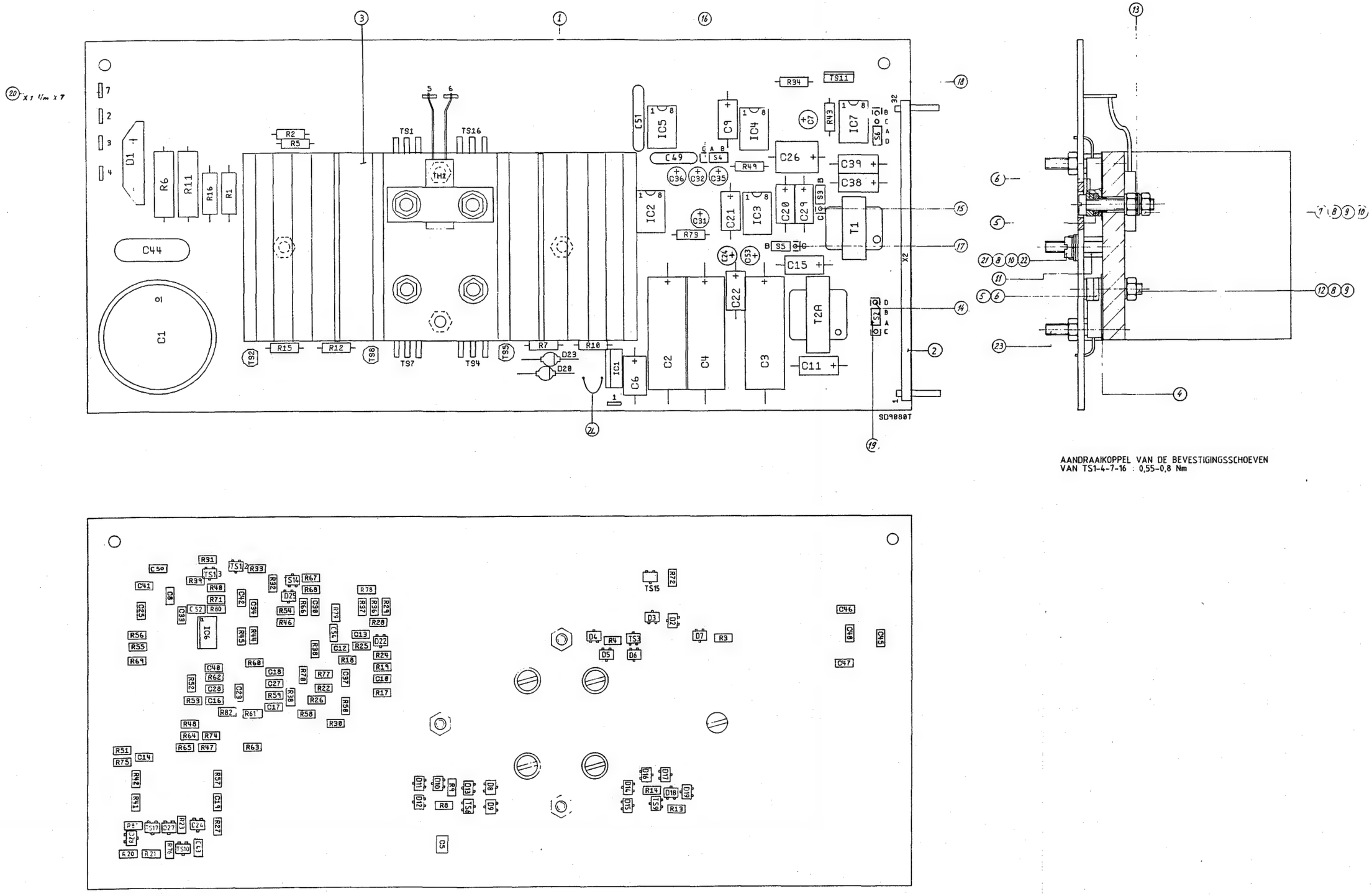
LOCATION OF COMPONENTS OF CONNECTOR PANEL





PC BOARD
PRENTPANEEL 3922 151 90810

LOCATION OF COMPONENTS BASIC P.C.B.

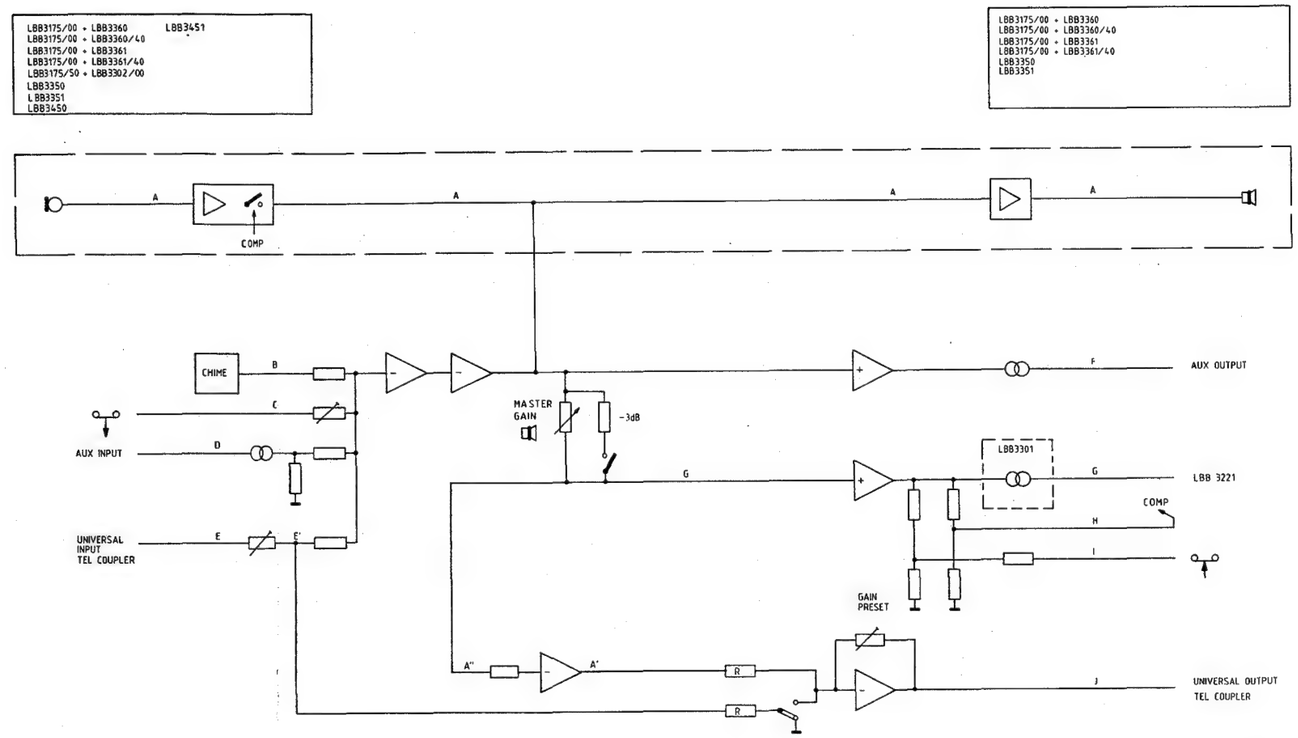


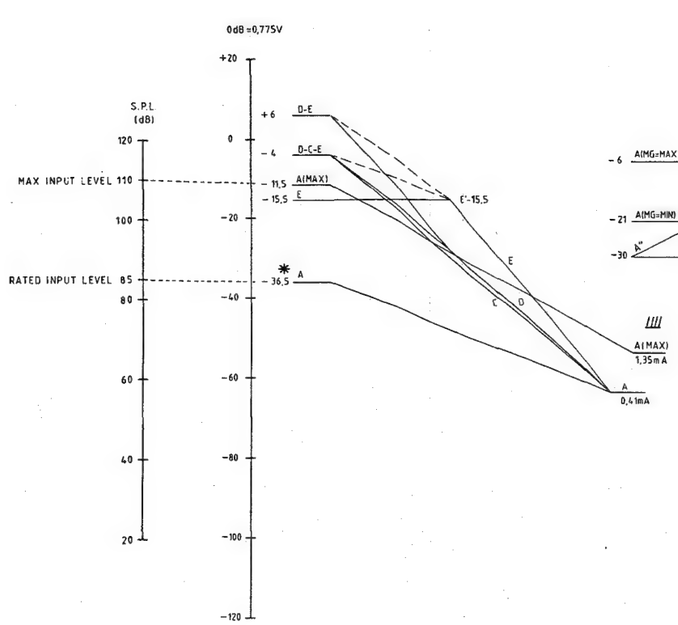
9D9080B

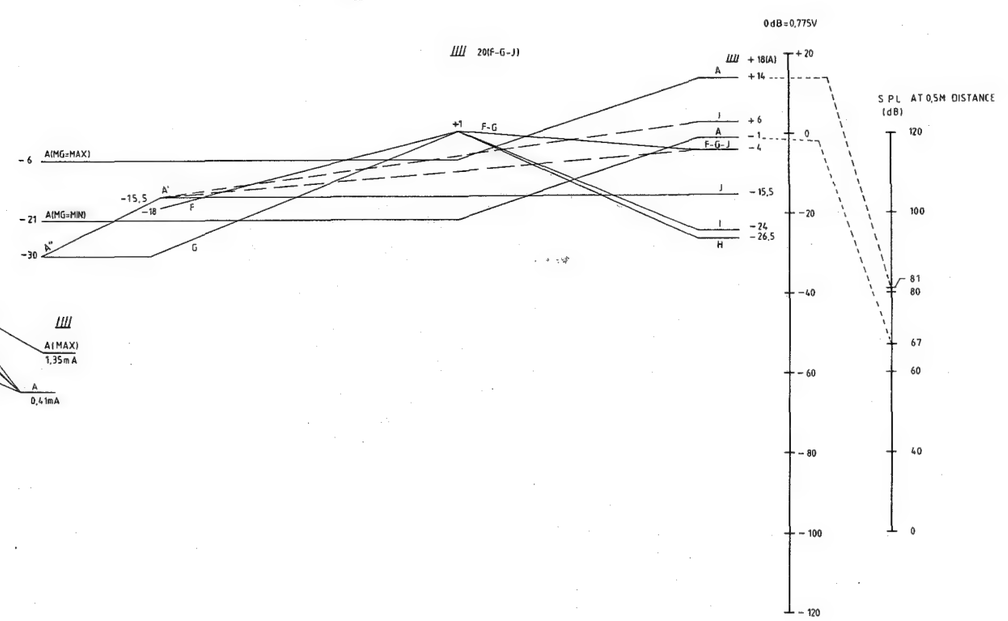
3922 151 90880 PC BOARD / PRENTPANEEL

AANDRAAIKOPPEL VAN DE BEVESTIGINGSSCHOEVEN
VAN TS1-4-7-16 : 0,55-0,8 Nm

LEVEL DIAGRAM CCS400





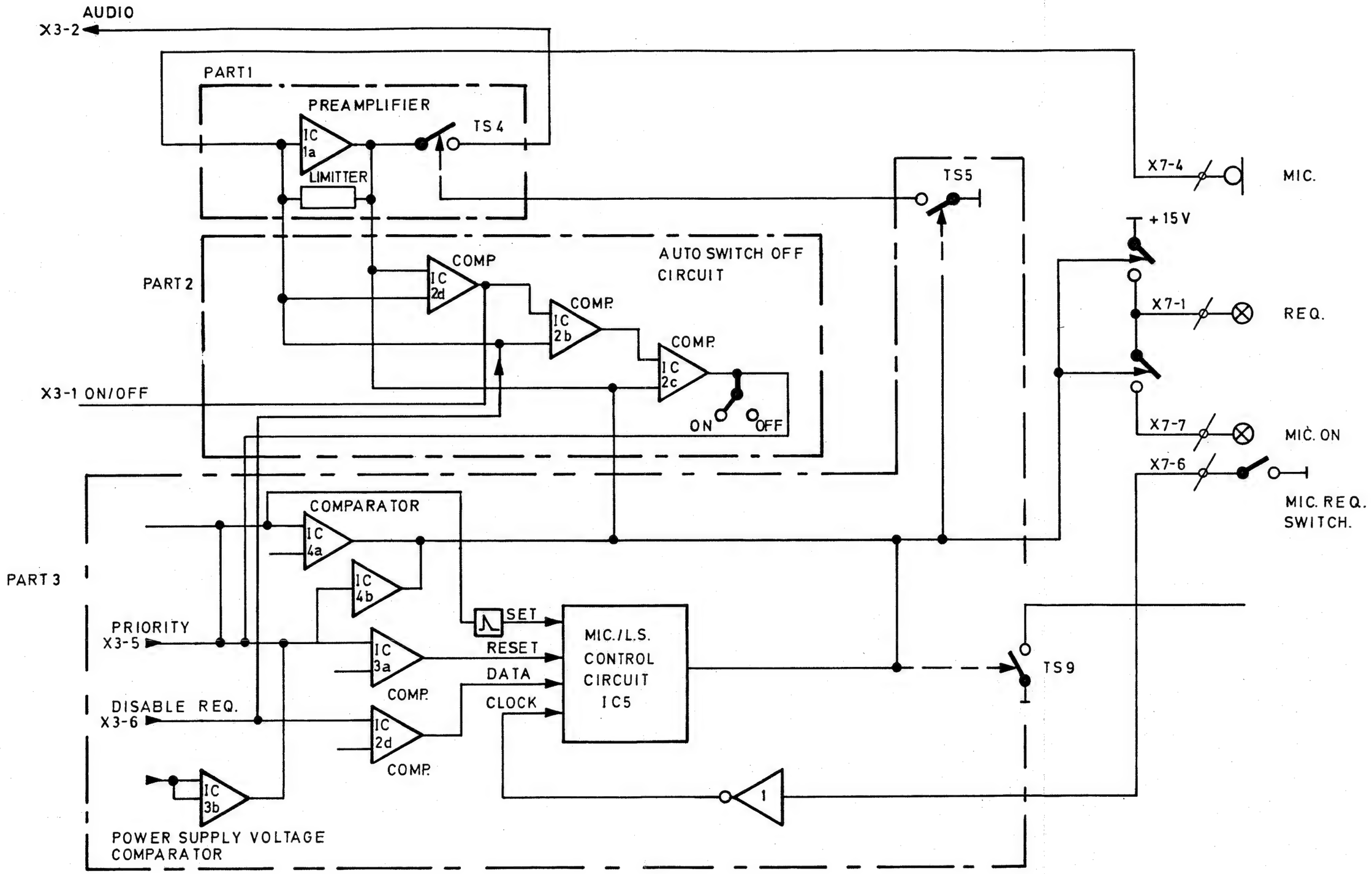


THE VALUES STATED IN THIS LEVEL DIAGRAM ARE TYPICAL VALUES
FOR EXACT VALUES SEE SHEET 190-3,-4,-5

✱ LBB3302/00 -39dB

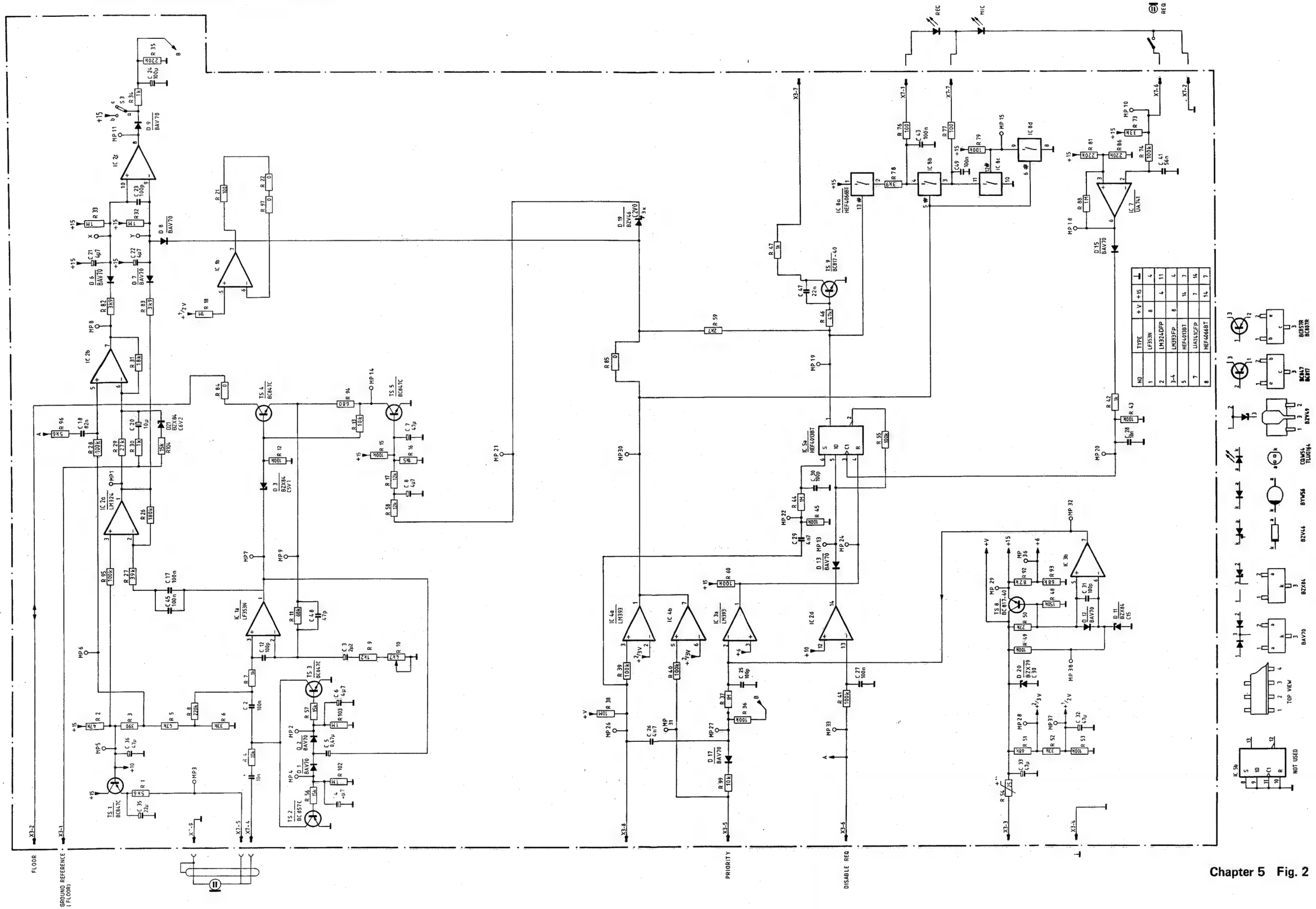
Chapter 4 Fig. 6

BLOCK DIAGRAM OF MICROPHONE PLUG IN UNIT



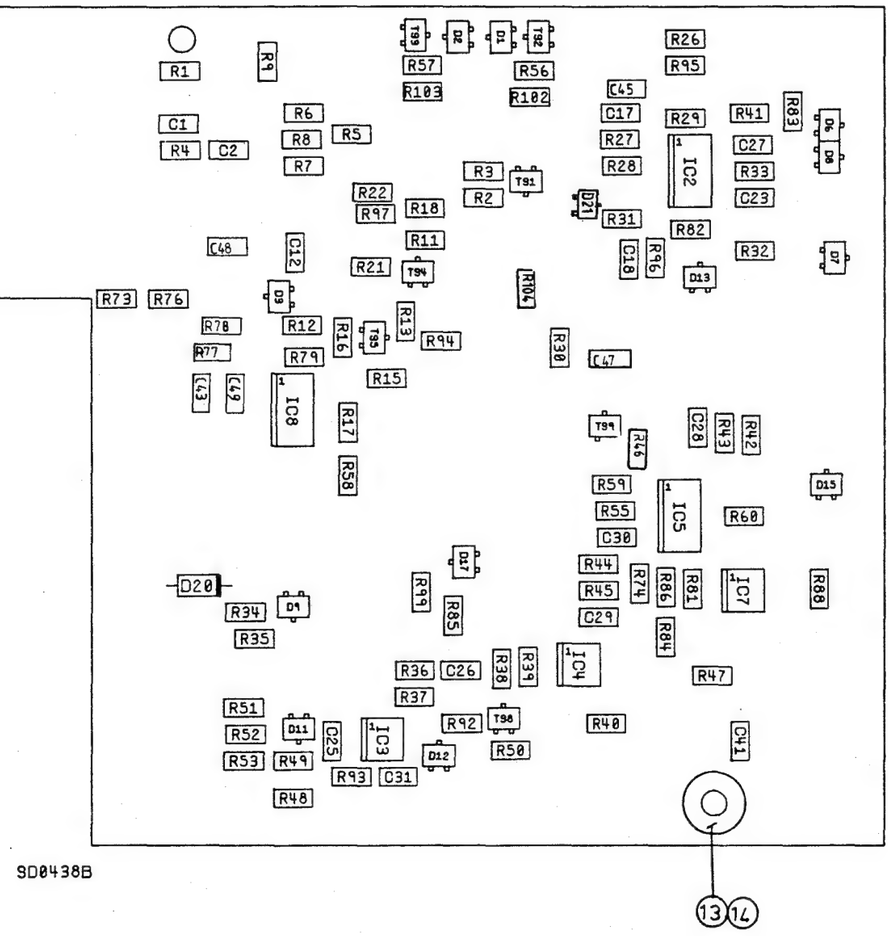
Chapter 5 Fig. 1

CIRCUIT DIAGRAM OF MICROPHONE PLUG IN UNIT

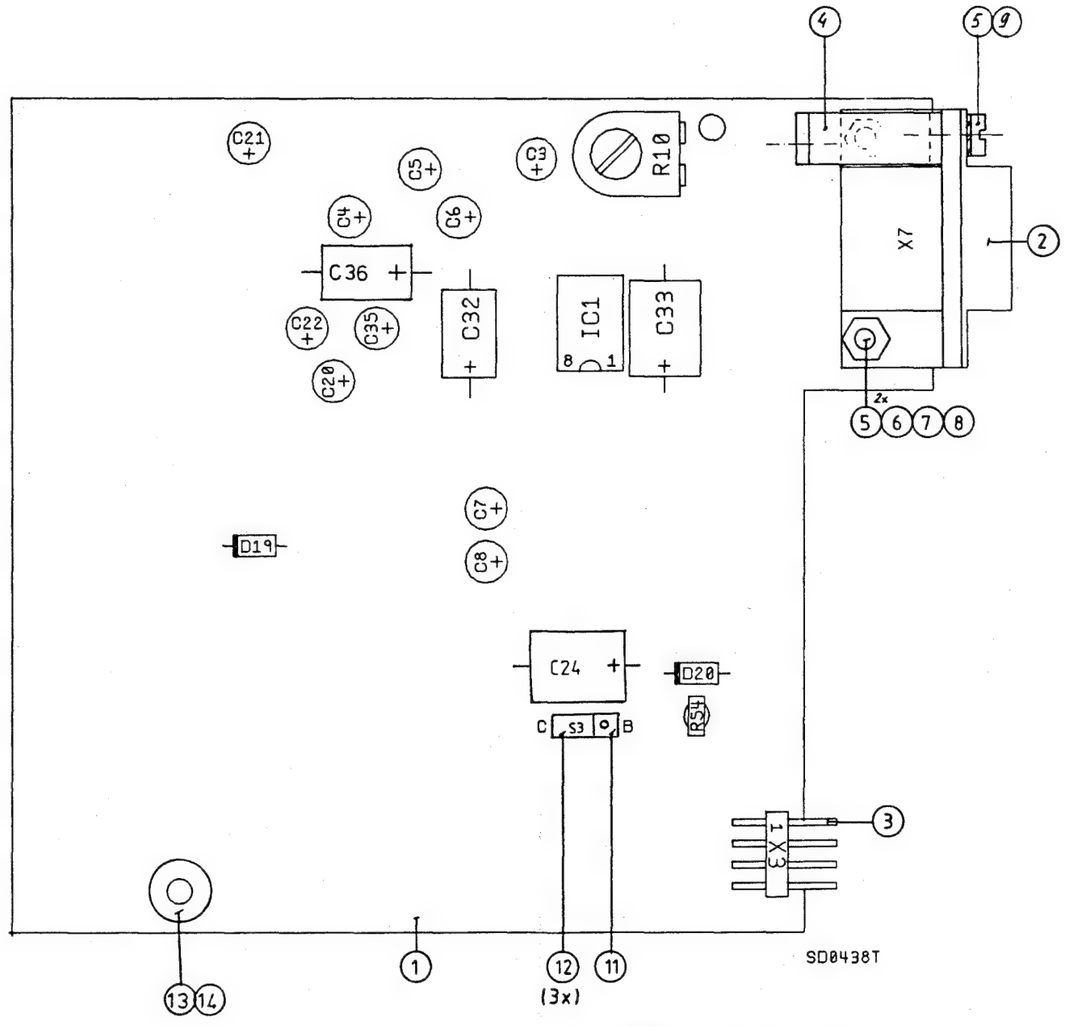


Chapter 5 Fig. 2

LOCATION OF COMPONENTS MICROPHONE PLUG IN UNIT



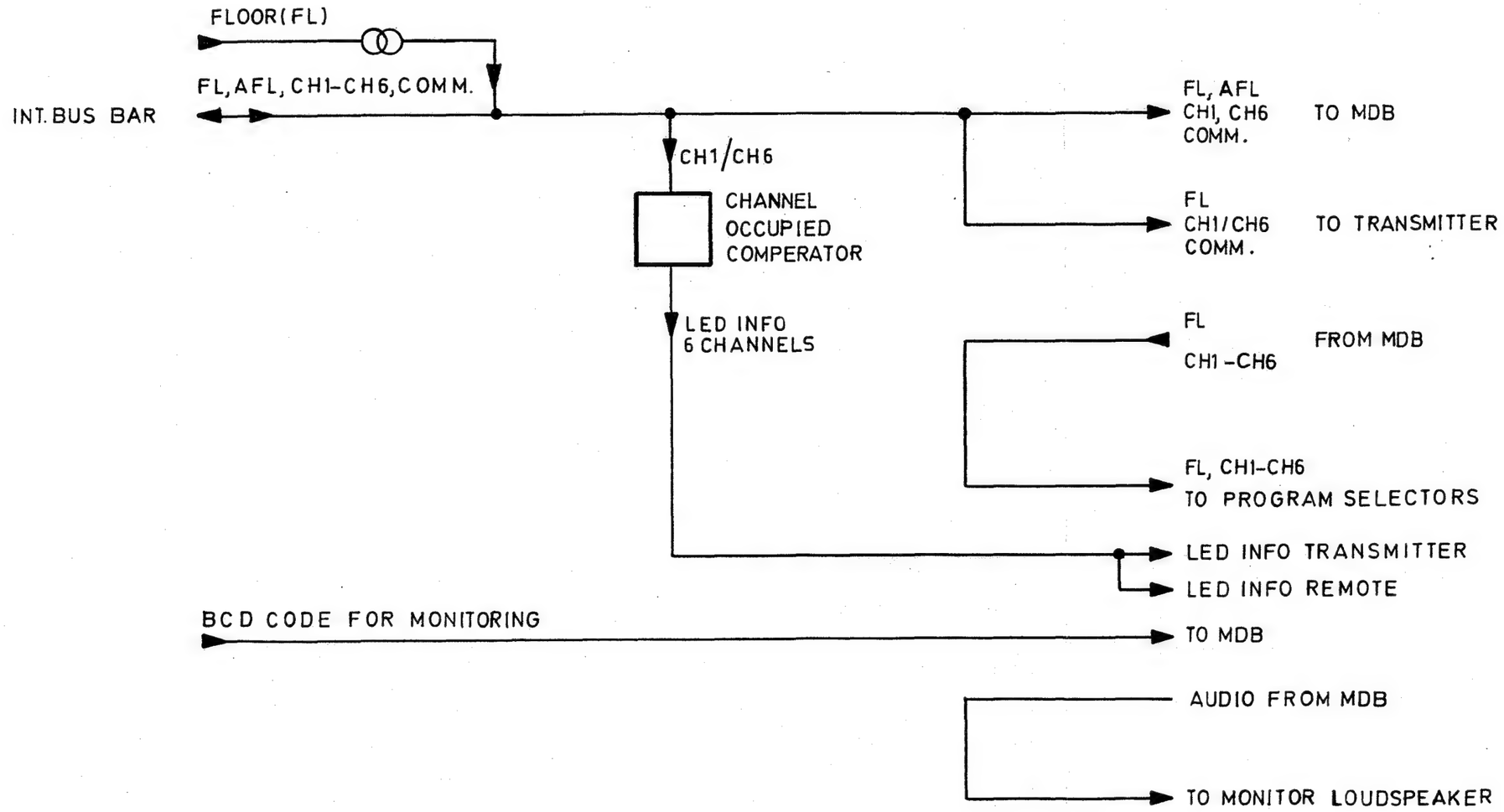
SD0438B



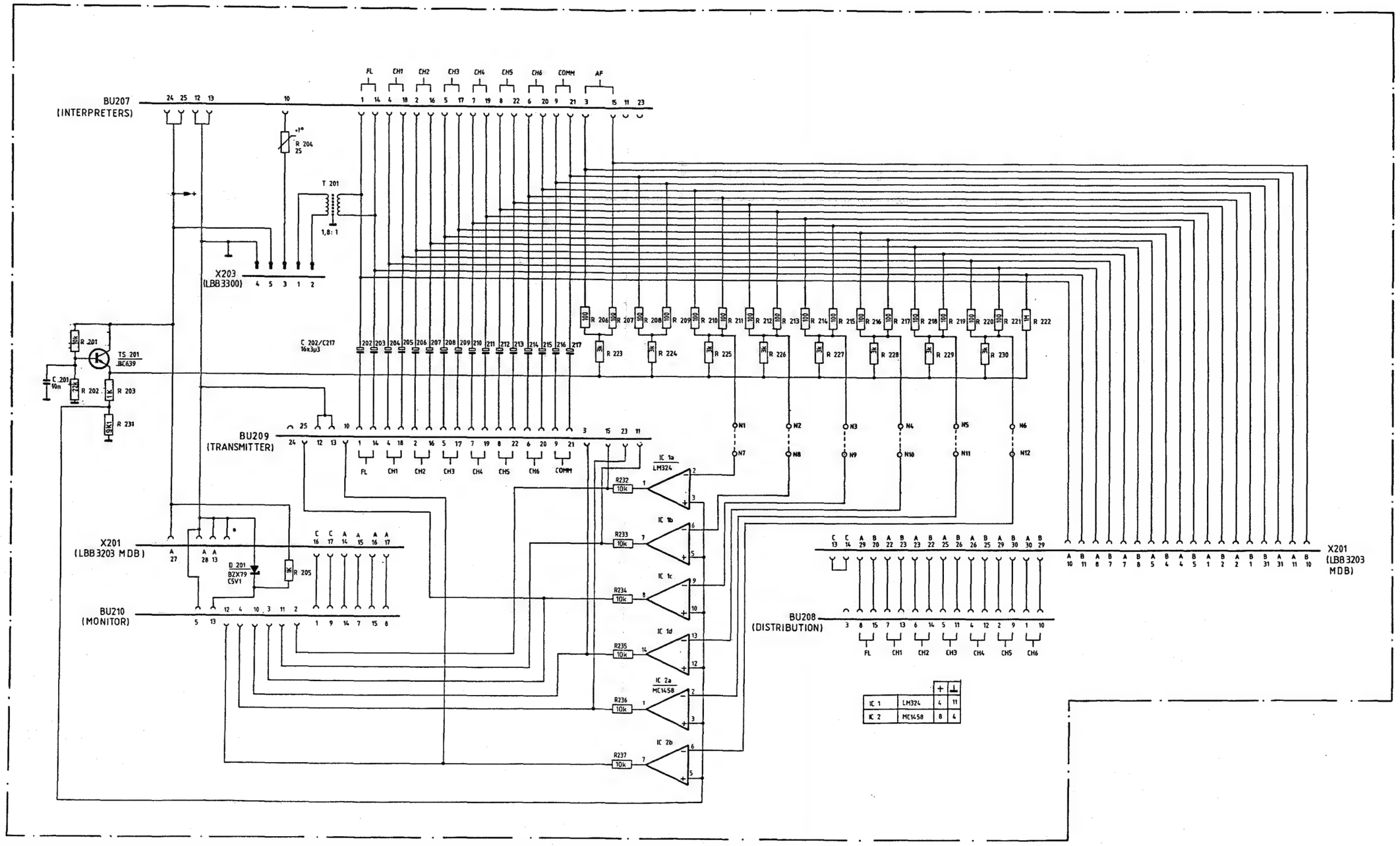
SD0438T

PC BOARD
PRENTPANEEL 3922 151 90840

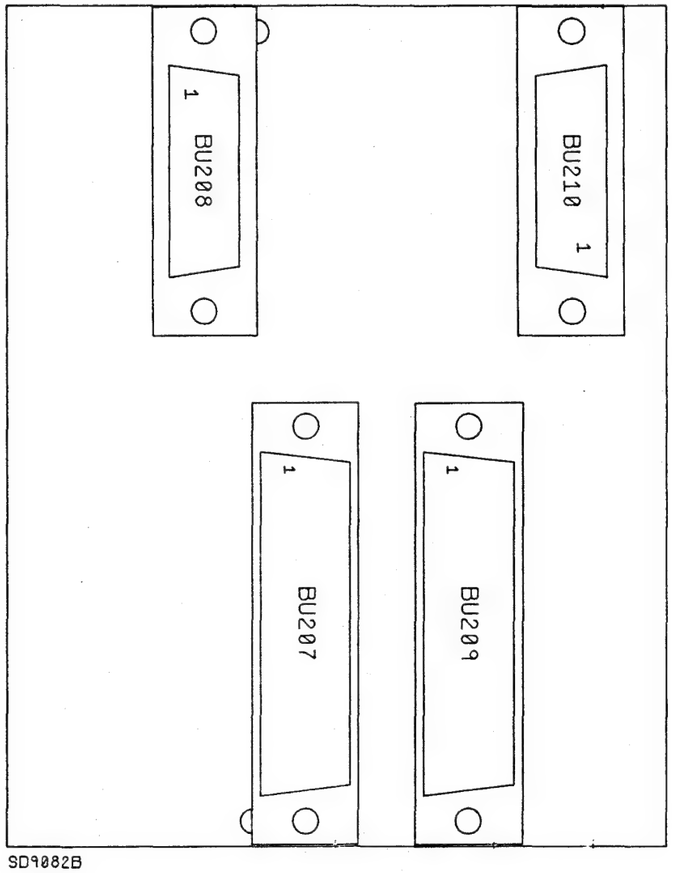
DETAILED BLOCKDIAGRAM OF MONITOR AND INTERPRETERS PANEL



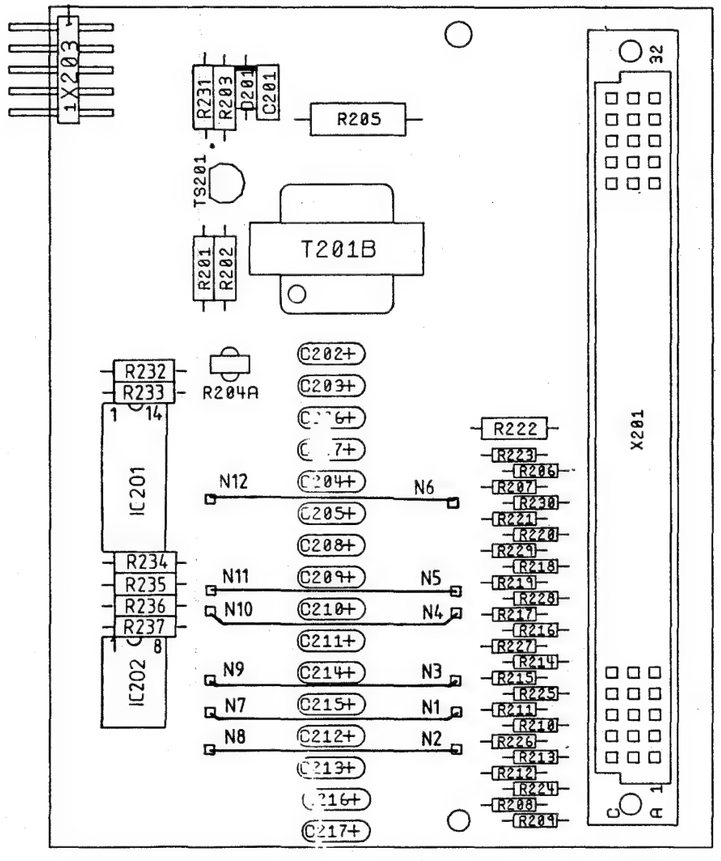
CIRCUIT DIAGRAM OF INT. AND MON. PANEL



LOCATION OF COMPONENTS INT. AND MON. PANEL



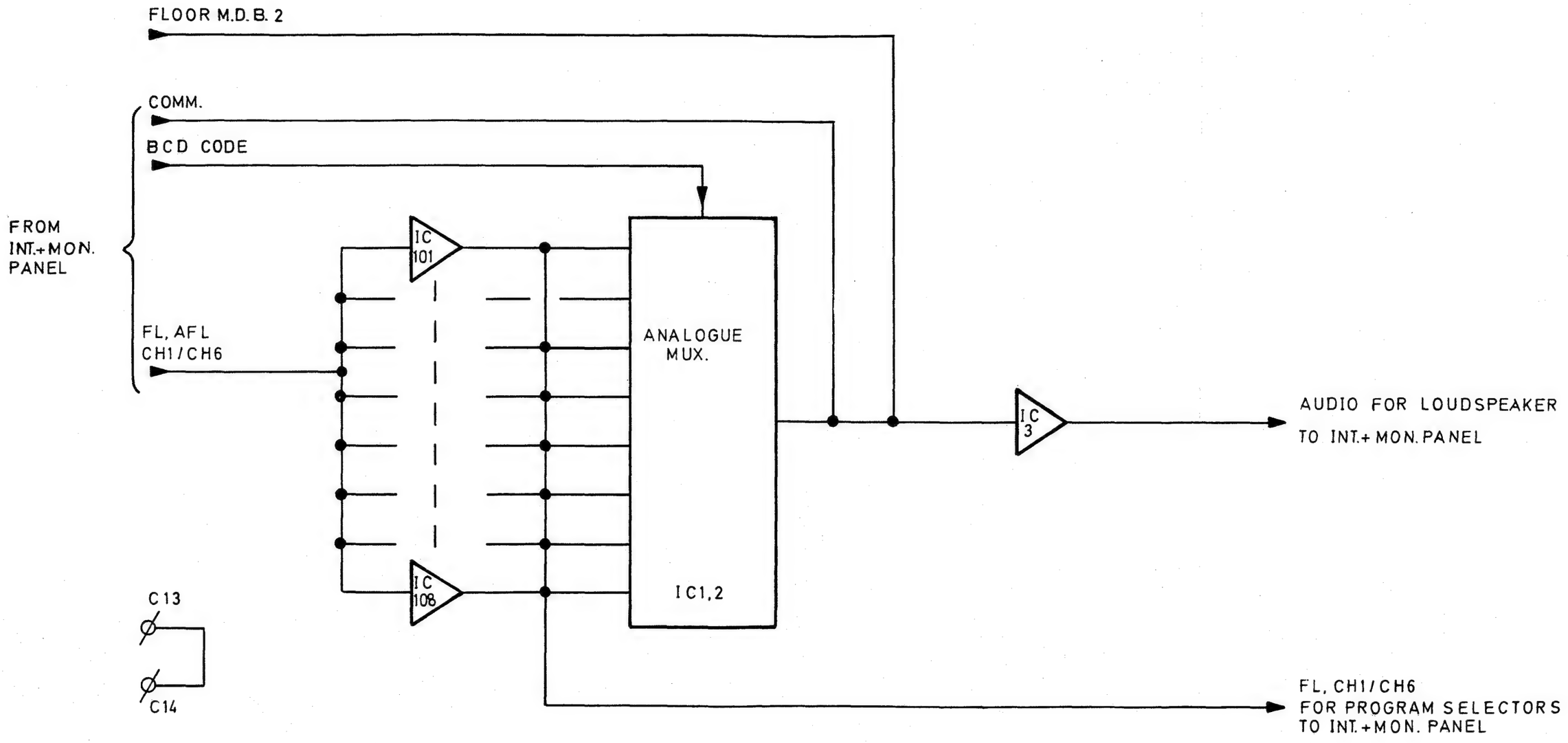
SD9082B



SD9082T

PC BOARD
PRENTPANEEL 3922 151 90820

BLOCK DIAGRAM MONITOR DISTRIBUTION BOARD

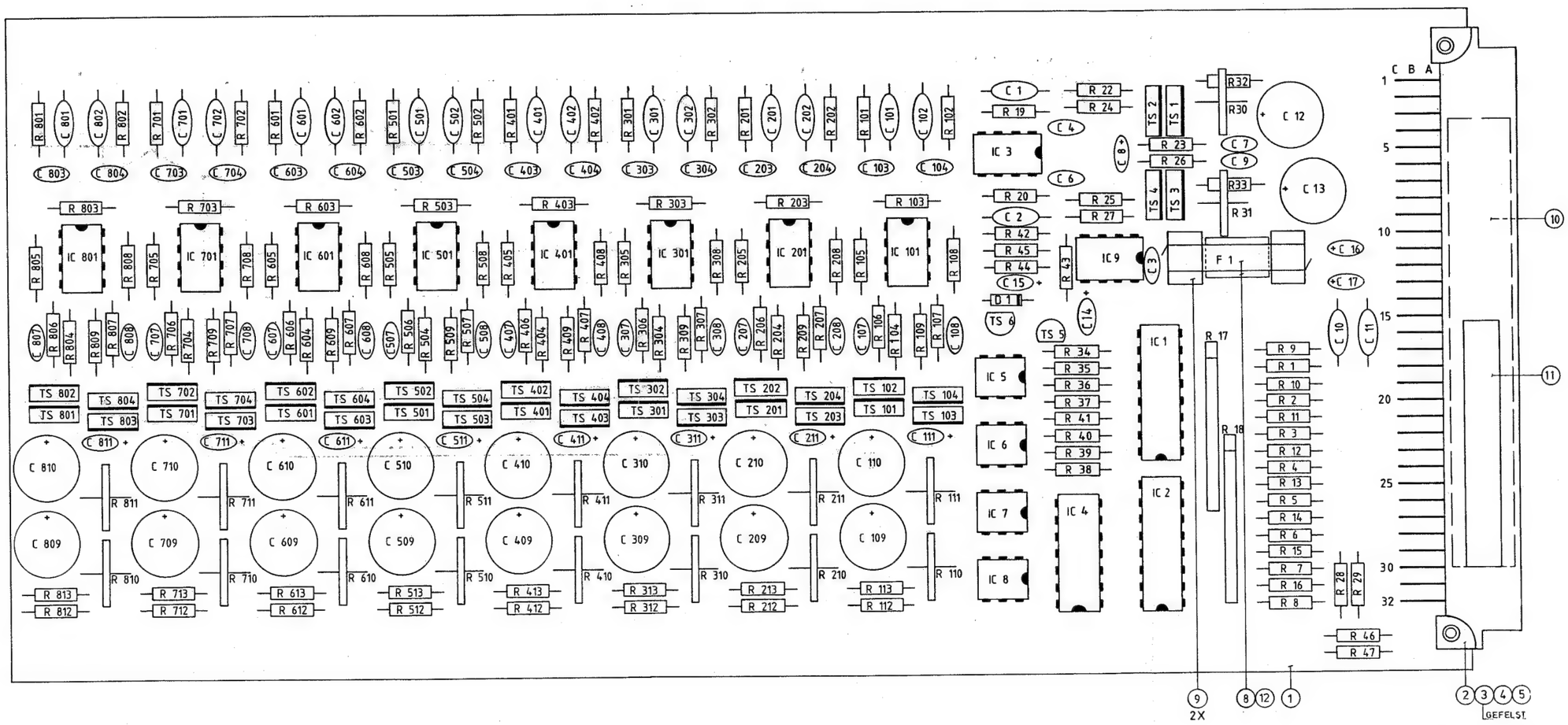


CIRCUIT DIAGRAM MONITOR DISTRIBUTION BOARD

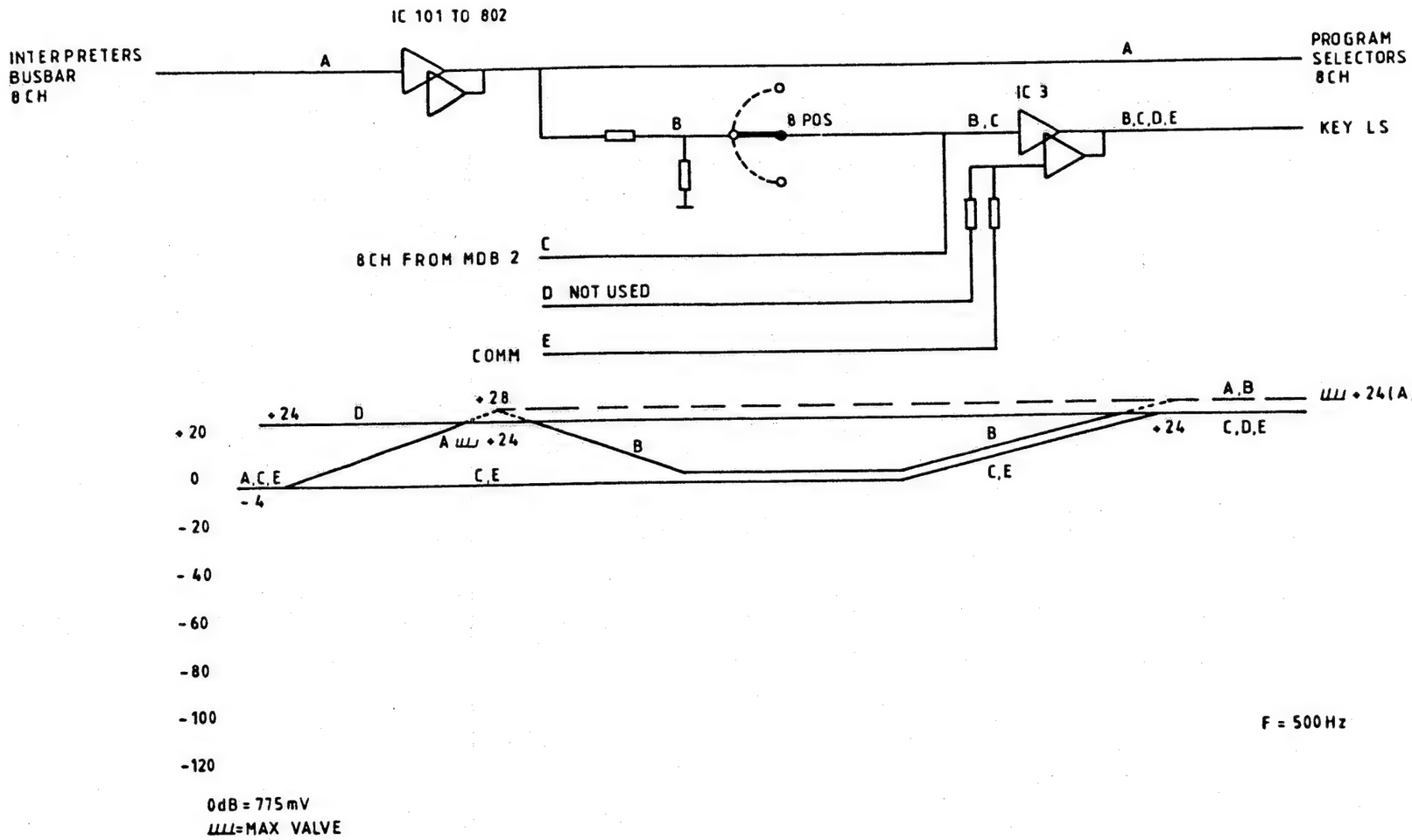
		+27	+21,5	⊥	+6,5
IC3–IC101/108	NE 5532	8		4	
IC9	NE 5534	7		4	
IC1–2	HEF4051		16		7–8
IC4	HEF40106		14		7

Chapter 7 Fig. 2

COMPONENT LOCATION MONITOR DISTRIBUTION BOARD



LEVEL DIAGRAM MDB LBB 3203/00



NO	TYPE	+ V	+15	⏚
1	LF353N	8		4
2	LM324D		4	11
3-4	LM393D	8		4
5	HEF4013BT		14	7

IC 5b
NOT USED

TOP VIEW

BAV70

BZX84

BZV46

BYW56

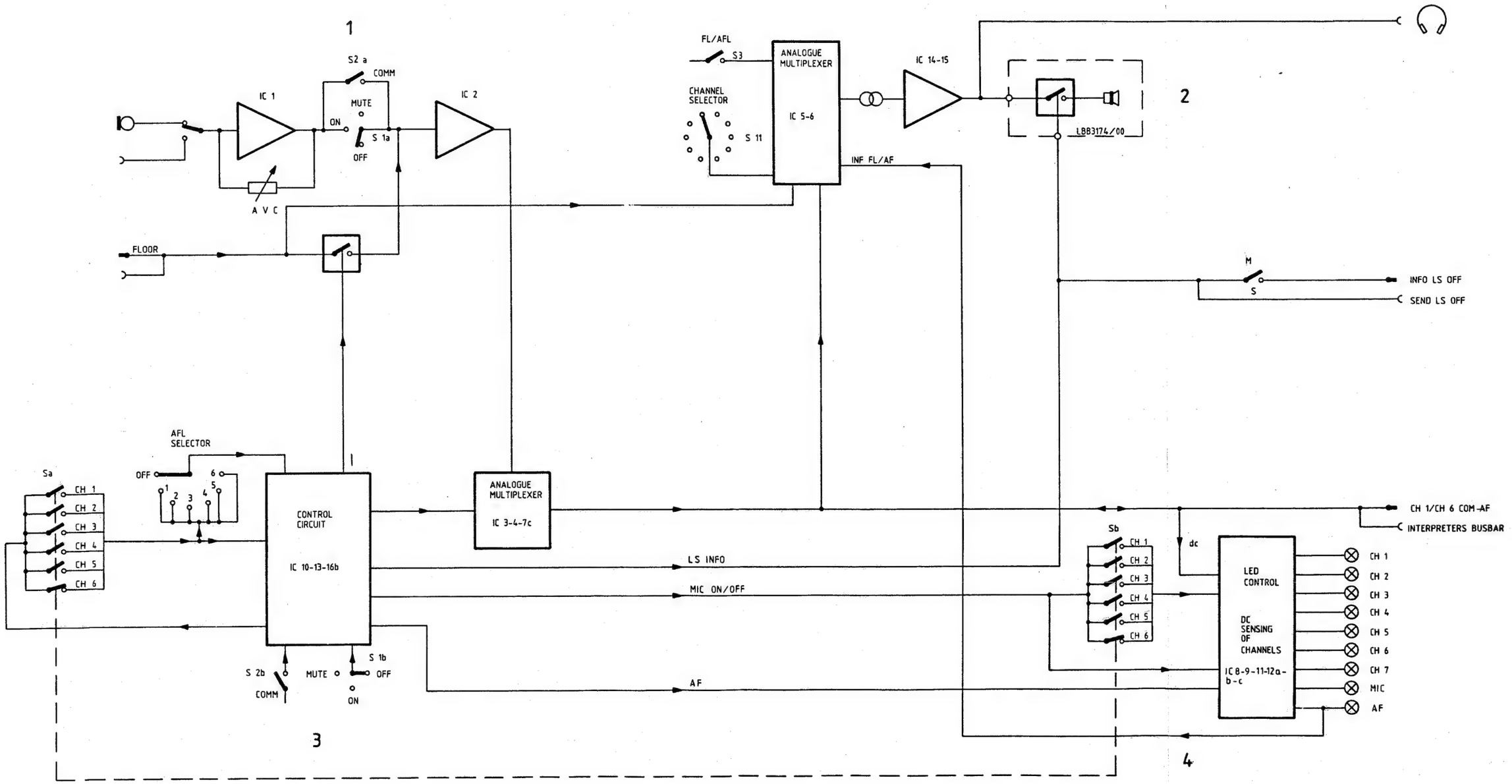
CQW54
TLUG164

BZV49

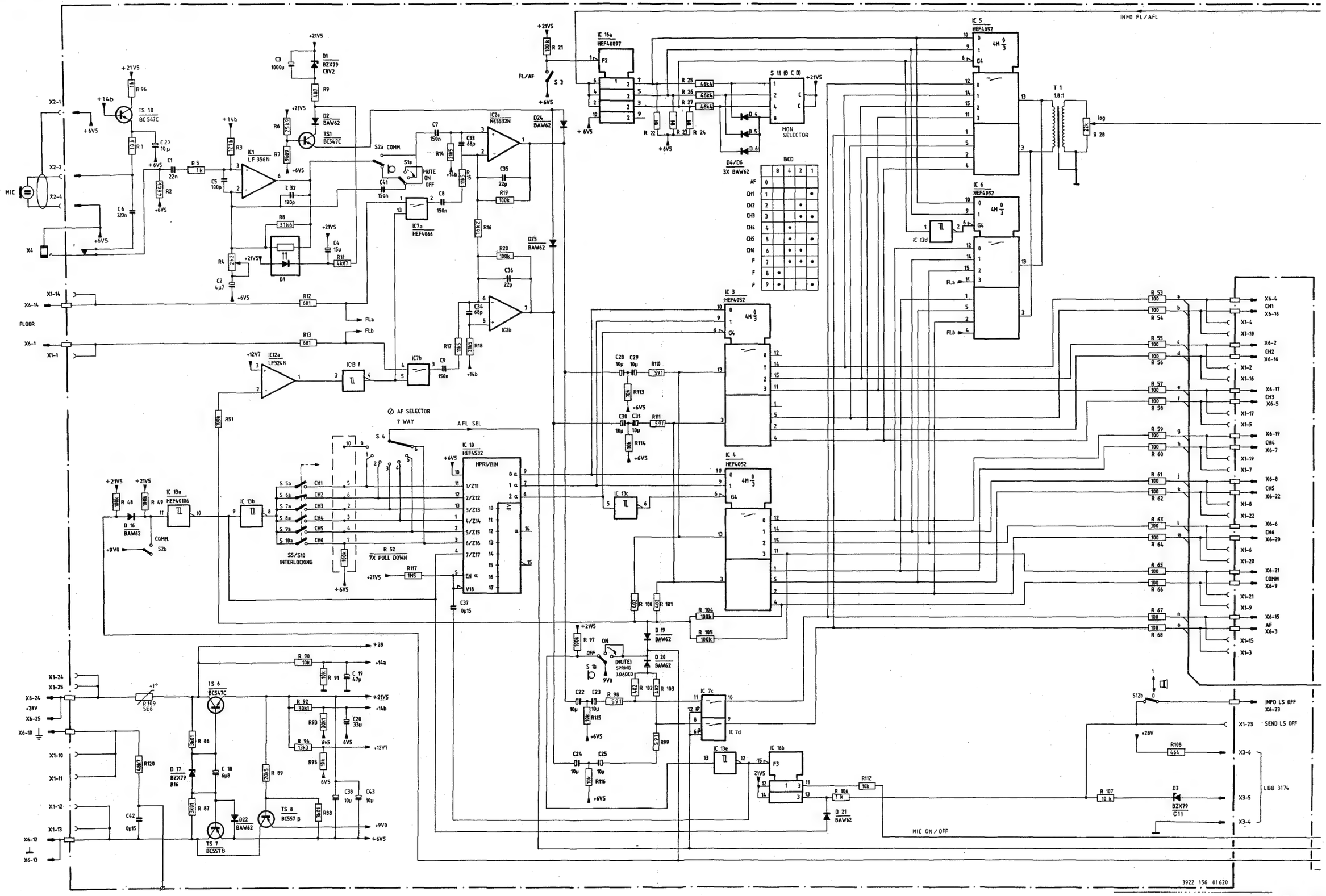
BC847C
BC817-40

BC857C
BC807-40

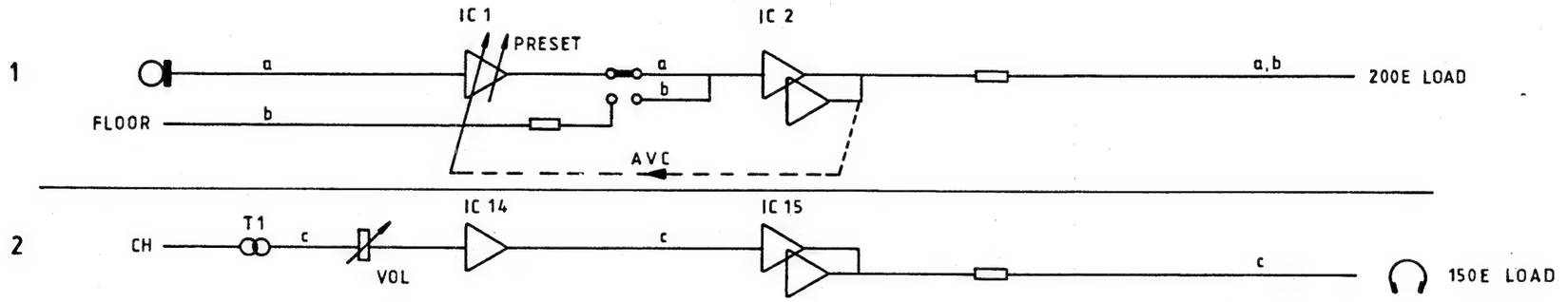
BLOCK DIAGRAM 6 CHANNEL INTERPRETER'S DESK

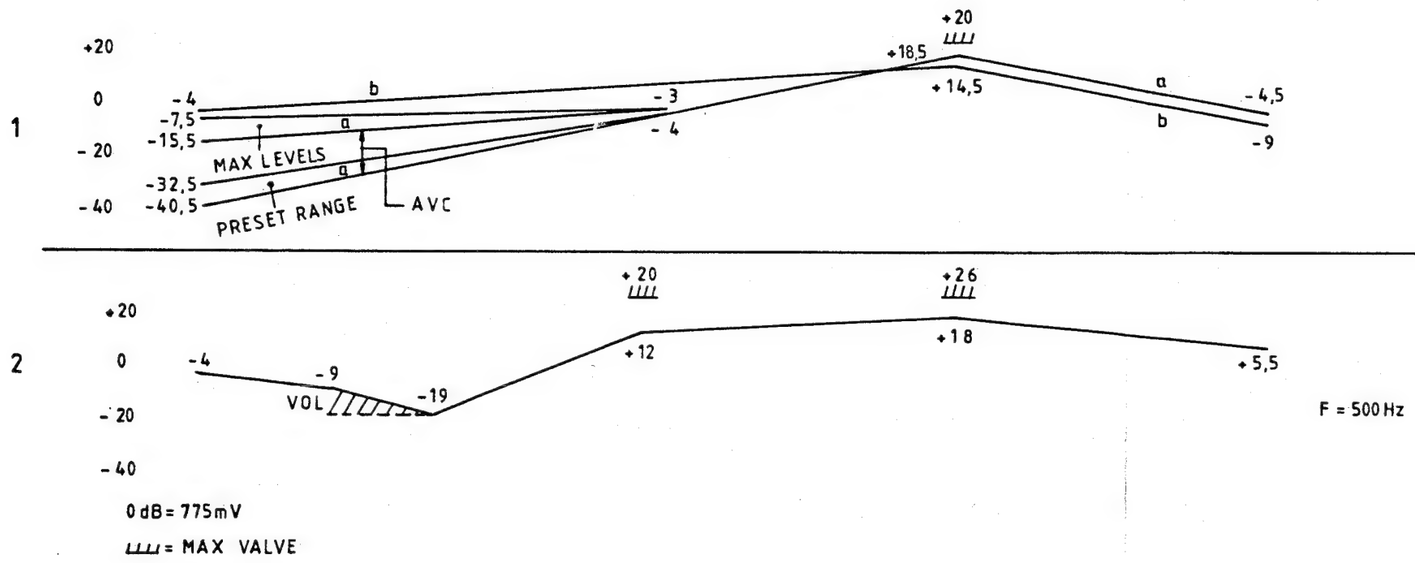


CIRCUIT DIAGRAM 6 CHANNEL INTERPRETER'S DESK

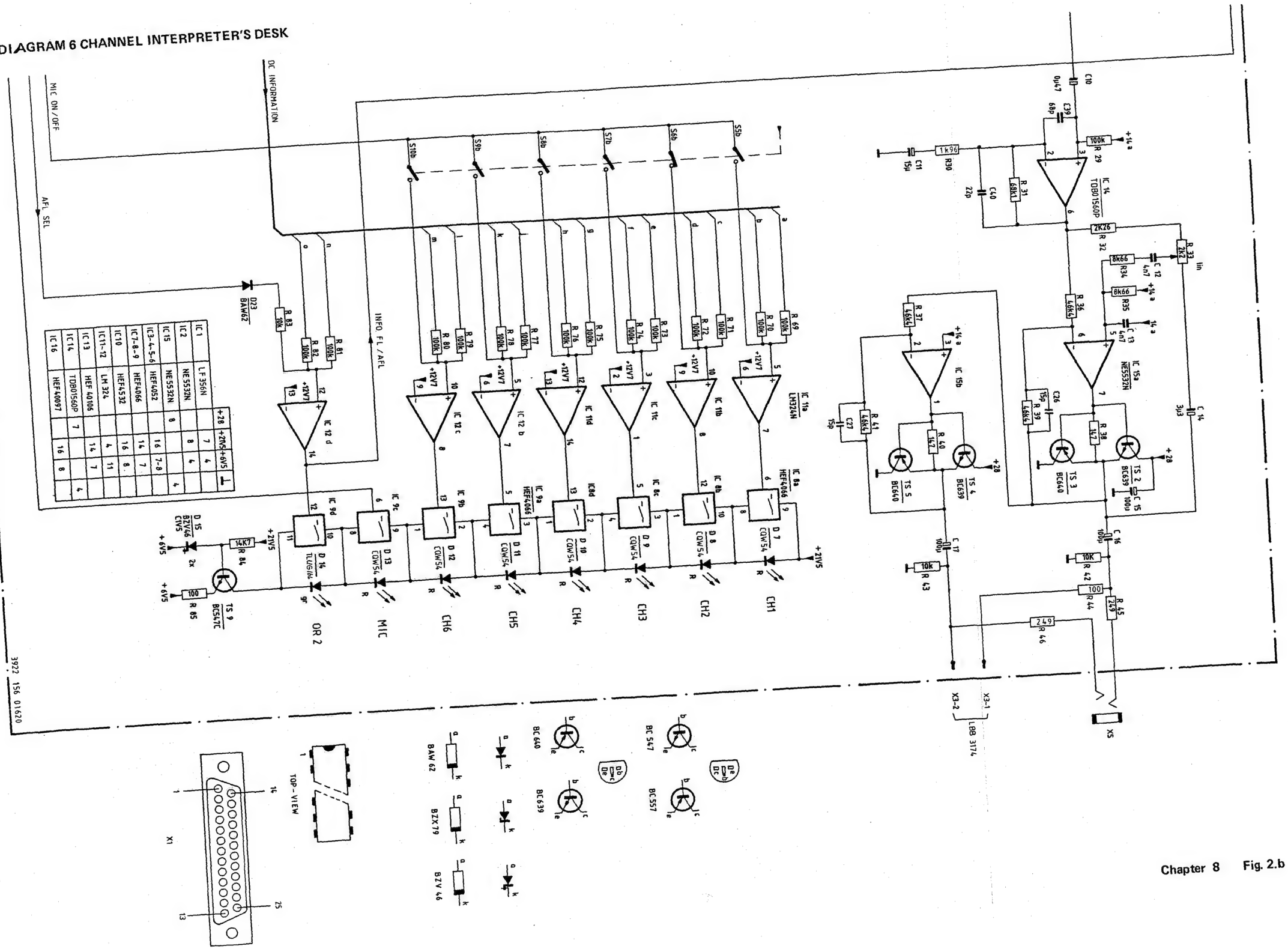


LEVEL DIAGRAM INTERPRETER'S DESK LBB 3221/00



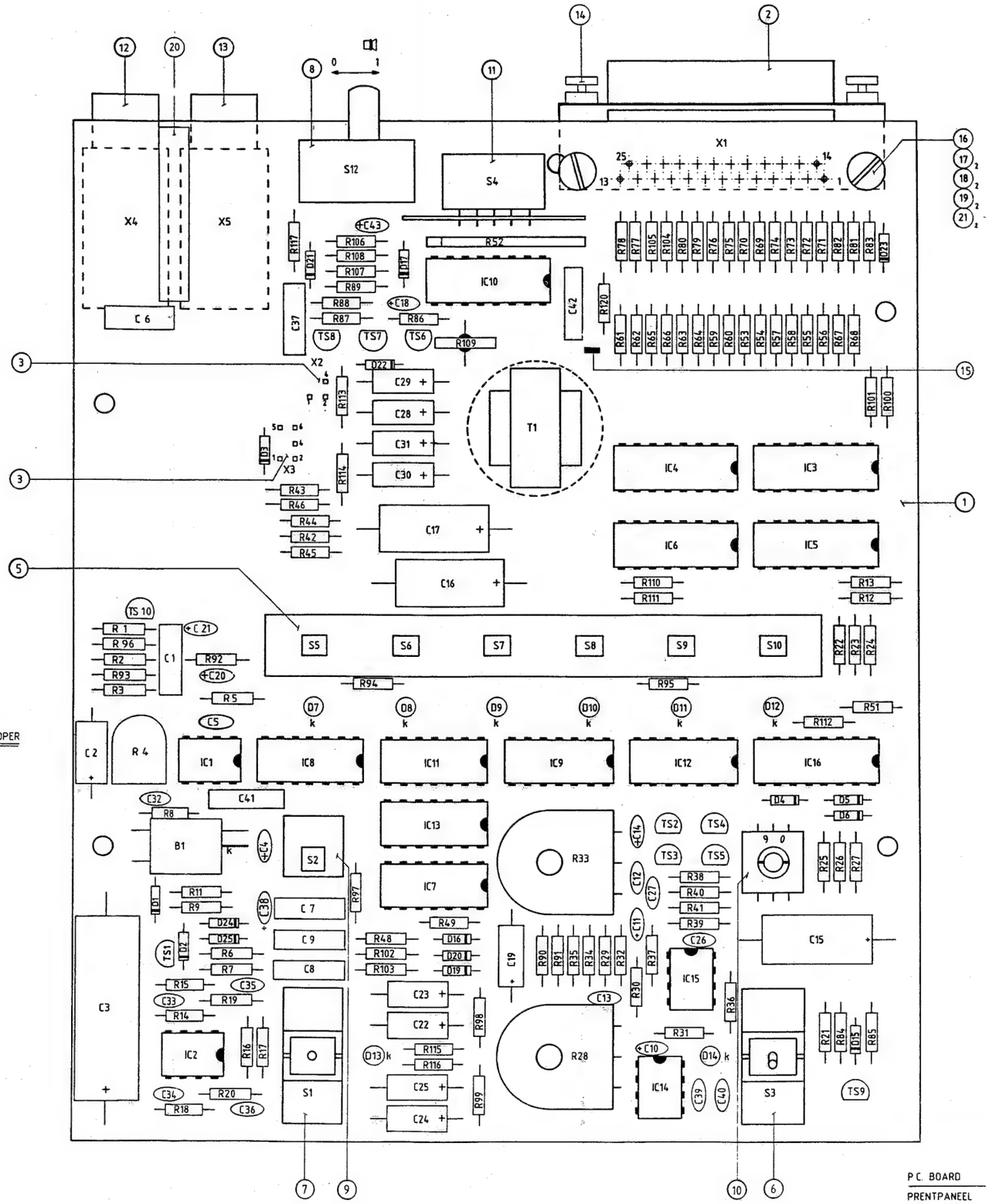


CIRCUIT DIAGRAM 6 CHANNEL INTERPRETER'S DESK



Chapter 8 Fig. 2.b

LOCATIONS OF COMPONENTS 6 CHANNEL INTERPRETER'S DESK



Chapter 8 Fig. 3

PC BOARD
PRENTPANEEL 3922 151 90850

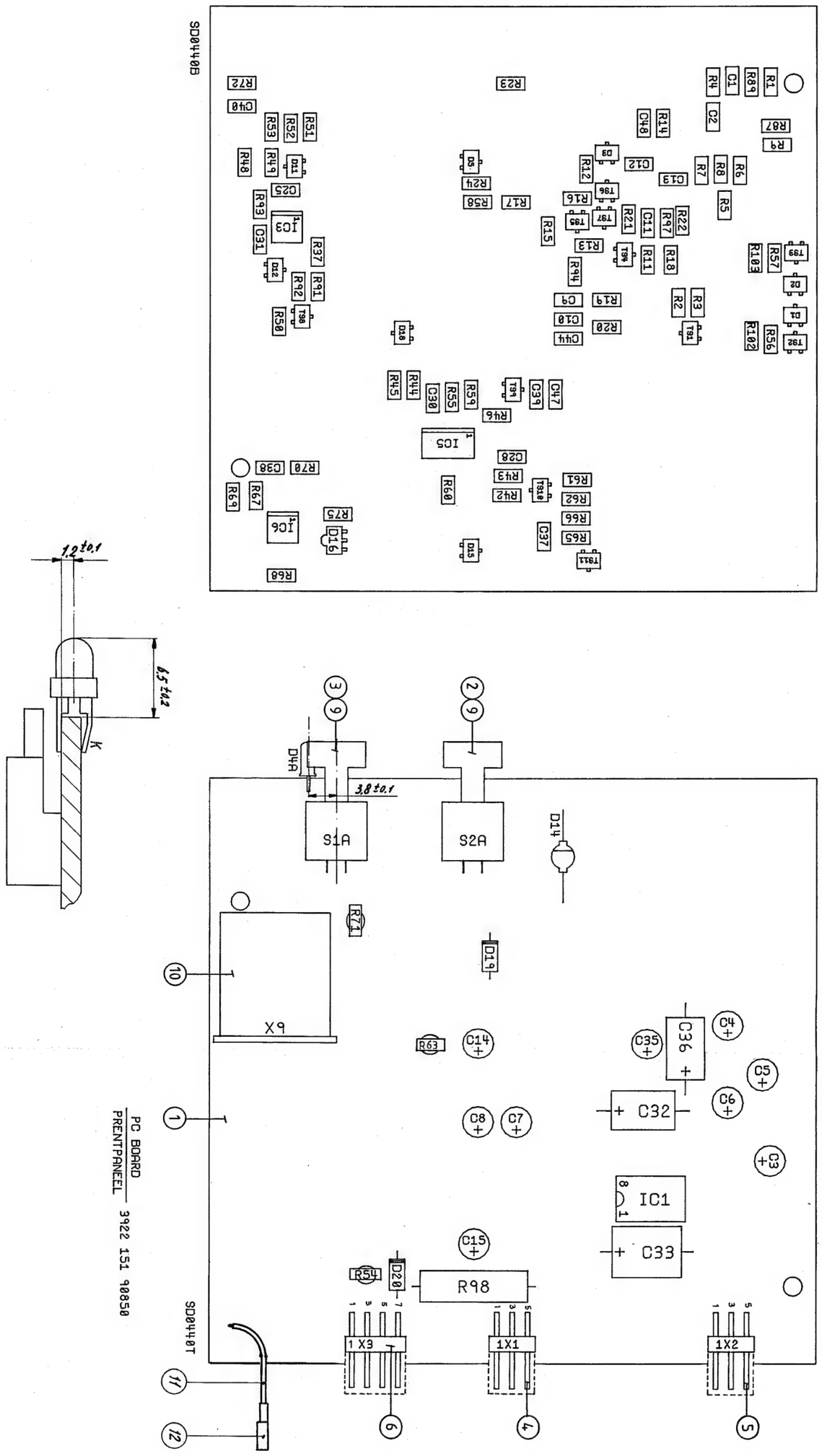
SD04139T

SD04139B

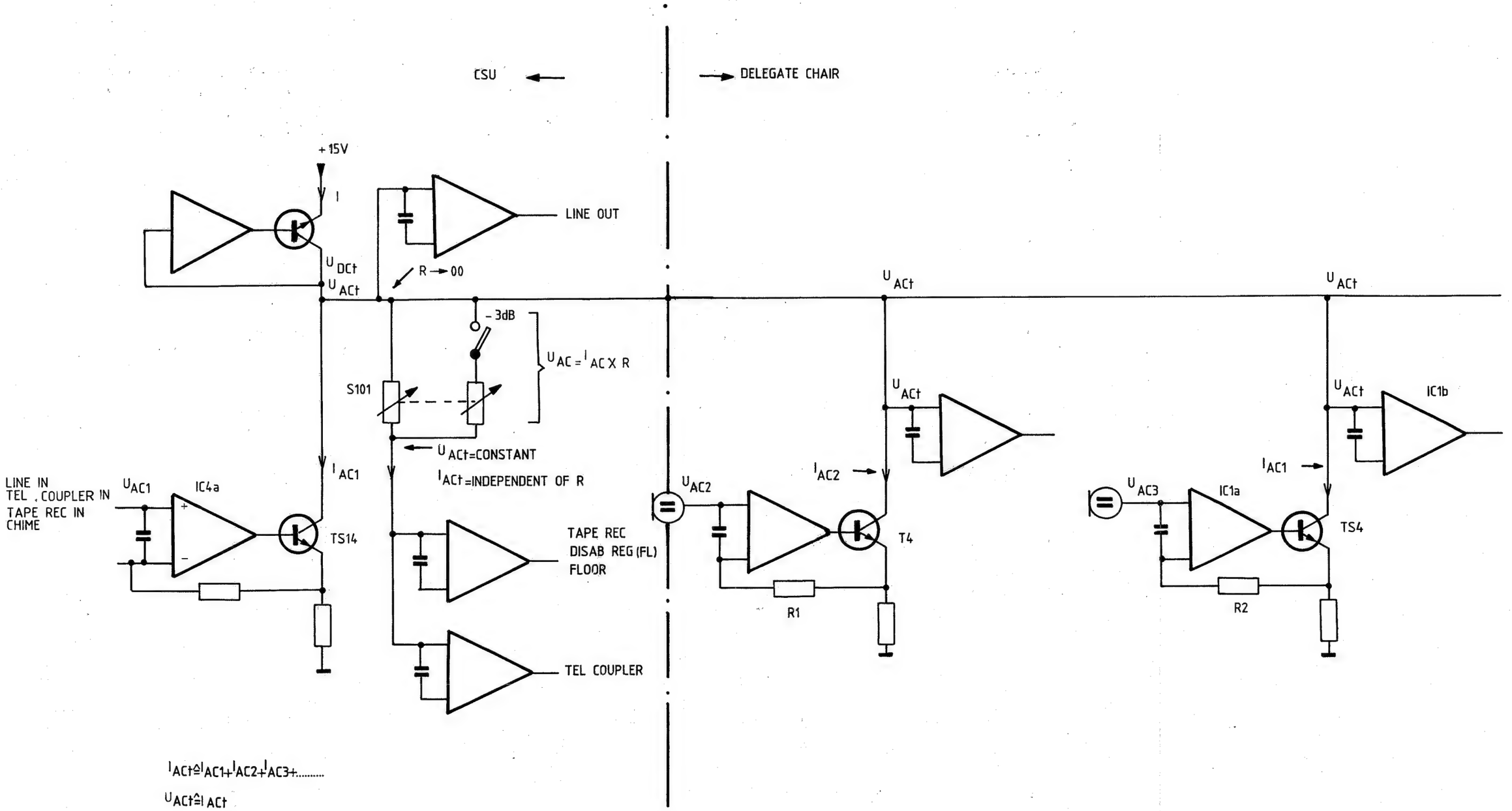
FLOOR X10-3
X10-4
GROUND REFERENCE (FLOOR)
X10-5 REMOTE
X10-1 PRIORITY
X10-2 DISABLE REQ.
X10-7 +V
X10-8
CASE
X10-6 REM
X9-3 X3-2 X3-1 X9-4 X2-3 X2-4 X2-1 X3-8 X3-5 X9-1 X3-6 X9-2 X3-3 X9-7 X13-1 X13-2 X3-4 X9-8 X3-7 X1-6 X1-2 X1-1 X1-5 X1-4
MIC D 4a CQW54
LS
TS 1 BC847C
TS 2 BC 857C
TS 3 BC847C
TS 4 BC847C
TS 5 BC847C
TS 6 BC817-40
TS 7 BC807-40
TS 8 BC 817-40
TS 9 BC817-40
TS 10 BC857C
TS 11 BC817-40
IC 1a LF353N
IC 1b
IC 3a LM393D
IC 3b
IC 5a HEF4013BT
IC 5b
IC 6 MC1741CD
D 1 BAV70
D 2 BAV70
D 3 BZX84 C5V1
D 5 BAV70
D 10 BAV70
D 11 BZX84 C15
D 12 BAV70
D 14 BYW56
D 15 BAV70
D 16 BZV49 C6V2
D 18 BAV70
D 19 BZV46 C2V0 3x
D 20 BZX79 C30
S1a
S2a /PRIORITY
R 1 5K6
R 2 47k
R 3 390
R 4 10k
R 5 47k
R 6 33k
R 7 1M
R 8 220k
R 9 0
R 10 100k
R 11 10 k
R 12 100k
R 13 10 k
R 14 560
R 15 100k
R 16 1k5
R 17 12k
R 18 1k
R 19 100k
R 20 18k
R 21 100
R 22 100k
R 23 22k
R 24 100k
R 37 1M
R 42 1k
R 43 100k
R 44 1M
R 45 100k
R 46 47k
R 51 68k
R 52 33k
R 53 100k
R 54 25
R 55 100k
R 56 15k
R 57 15k
R 58 12k
R 59 2k7
R 60 100k
R 61 100k
R 62 100k
R 63 25
R 65 47k
R 66 10k
R 67 1M
R 68 100k
R 69 33k
R 70 100k
R 71 25
R 72 10k
R 75 100k
R 87 0
R 89 0
R 91 0
R 92 82k
R 93 68k
R 94 680
R 97 100k
R 98 390
R 102 1M
R 103 1M
C 1 10n
C 2 100n
C 3 10µ
C 4 4µ7
C 5 0,47µ
C 6 4µ7
C 7 47µ
C 8 4µ7
C 9 3n3
C 10 100n
C 11 47p
C 12 100p
C 13 100p
C 14 22µ
C 15 4µ7
C 25 100p
C 28 10n
C 30 100p
C 31 100p
C 32 47µ
C 33 47µ
C 35 22µ
C 36 47µ
C 37 10 n
C 38 10n
C 39 100n
C 40 100n
C 44 100n
C 47 100n
C 48 470p
MP 1 4
MP 2
MP 3
MP 4
MP 5
MP 7
MP 9
MP 12
MP 13
MP 16
MP 17
MP 19
MP 20
MP 21
MP 22
MP 23
MP 25
MP 26
MP 27
MP 28
MP 29
MP 32
MP 34
MP 35
MP 36
MP 37
MP 38
+15
+V
+Va
+1/2 V
+1/3 V
+t°
+6
+10
X2-5
X2-6

NO	TYPE	+ V	+15	⏚
1	LF353N	8		4
3	LM393D	8		4
5	HEF4013BT		14	7
6	MC1741CD		7	14

IC 5b
NOT USED
TOP VIEW
BAV70
BZX84
BZV46
BYW56
CQW54 TLUG164
BZV49
BC847C BC817-40
BC857C BC807-40

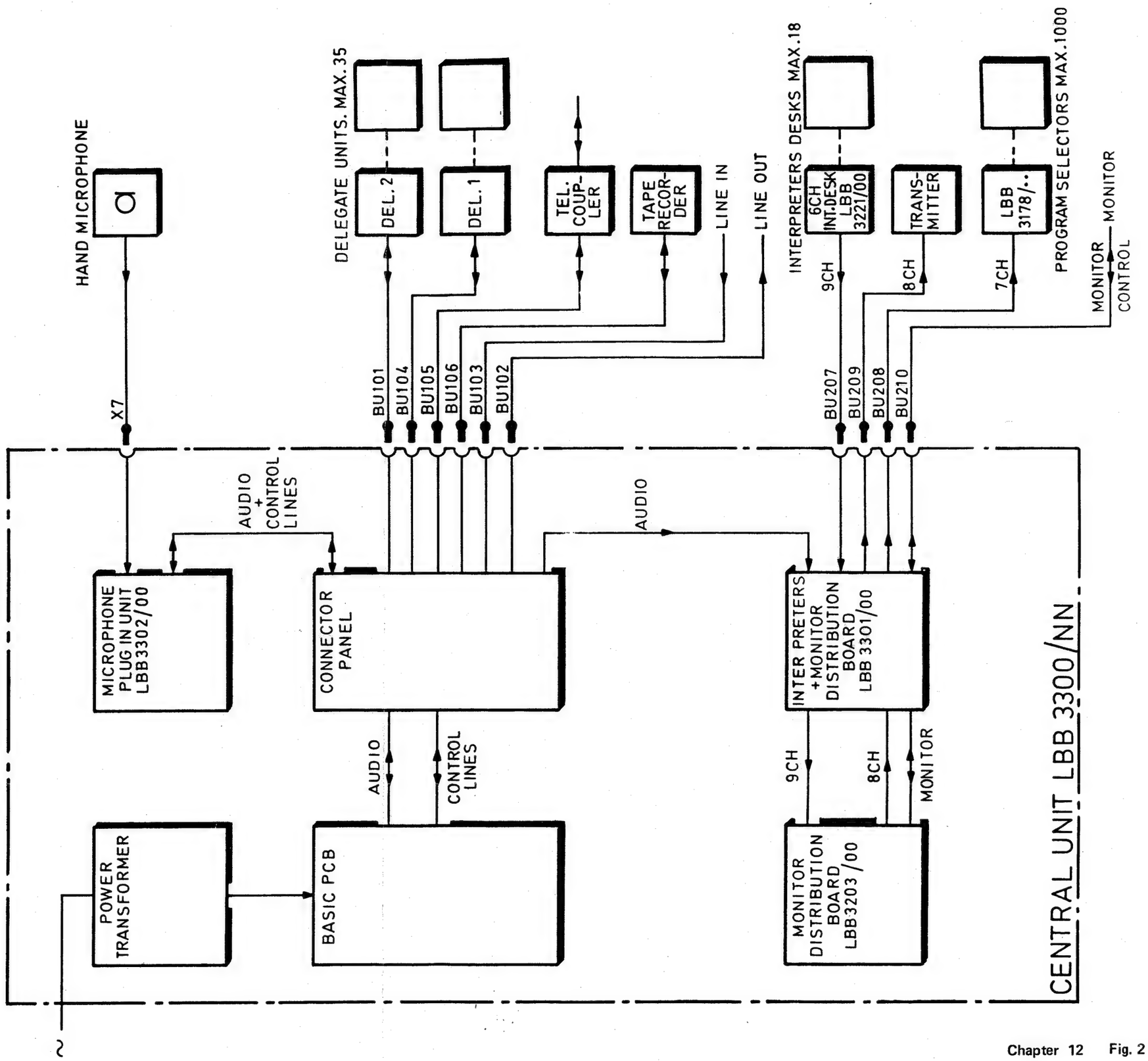

SD0440B
R72
C40
R51
R52
R53
R48
R49
T10
C25
R93
C31
IC3
R37
R91
D12
R92
T90
R50
R23
D8
R24
R58
R17
D3
R12
T96
R16
T95
T97
R15
R13
T94
R94
C9
R19
C10
C44
R20
C12
C48
R14
C13
R7
R8
R6
R5
C11
R21
R97
R22
R11
R18
R57
T93
R103
D2
R3
R2
T91
D1
T92
R56
R102
D6
R45
R44
C30
R55
R59
T91
C39
C47
R46
IC5
C28
R43
R42
T98
R61
R60
R62
R66
R65
C37
T911
D5
R70
C38
R69
R67
IC6
R75
D16
R68
1,2 ±0,1
4,5 ±0,2
K
3,8 ±0,1
D4A
S1A
S2A
D14
R71
D19
X9
R63
C14
C35
C36
C4
C5
C6
C32
C8
C7
C3
IC1
C33
C15
R54
D20
R98
1 X3
1X1
1X2
SD0440T
PC BOARD
PRENTPANEEL
3922 151 90850

CCS400 AUDIO PRINCIPLE

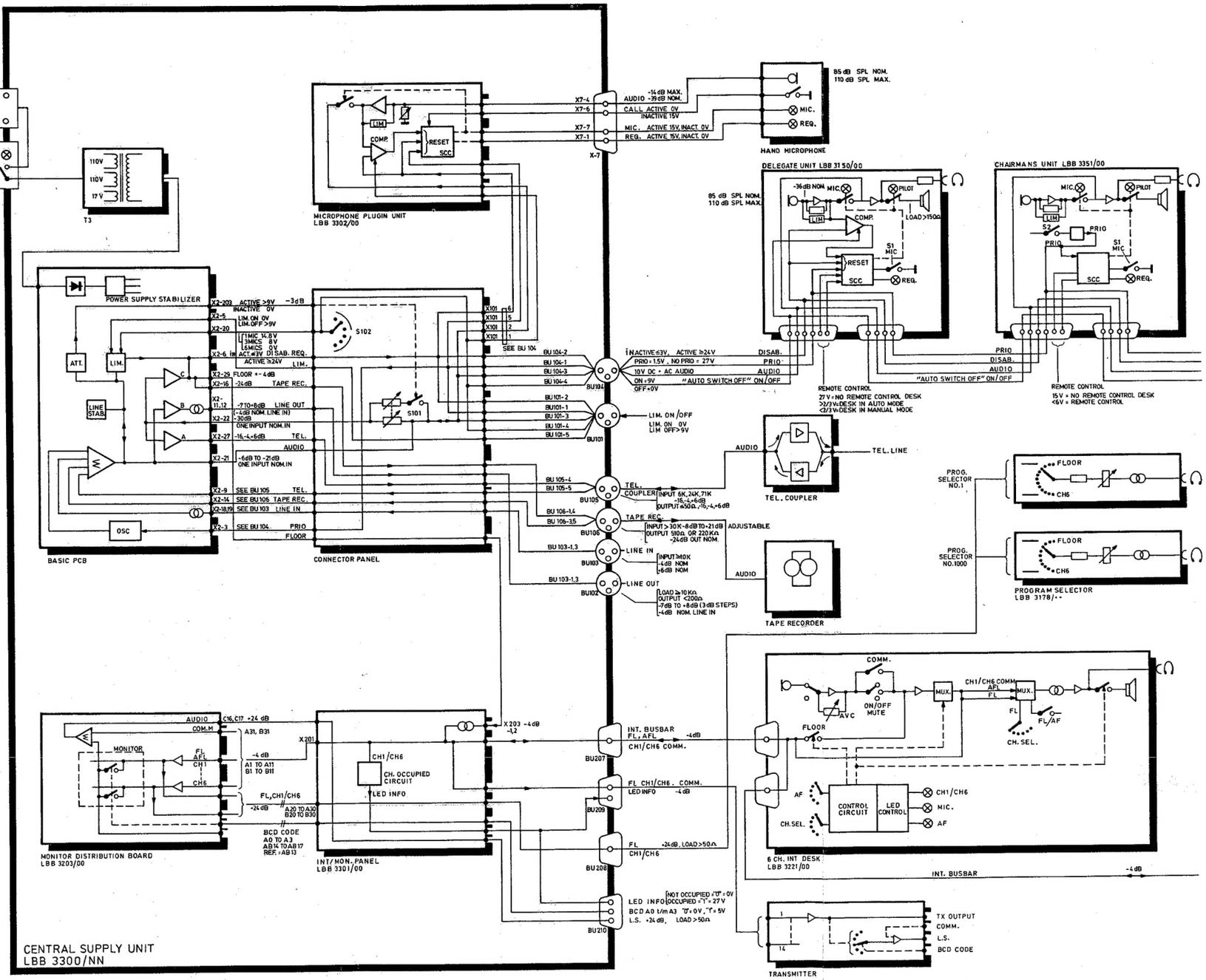


Chapter 12 Fig. 1

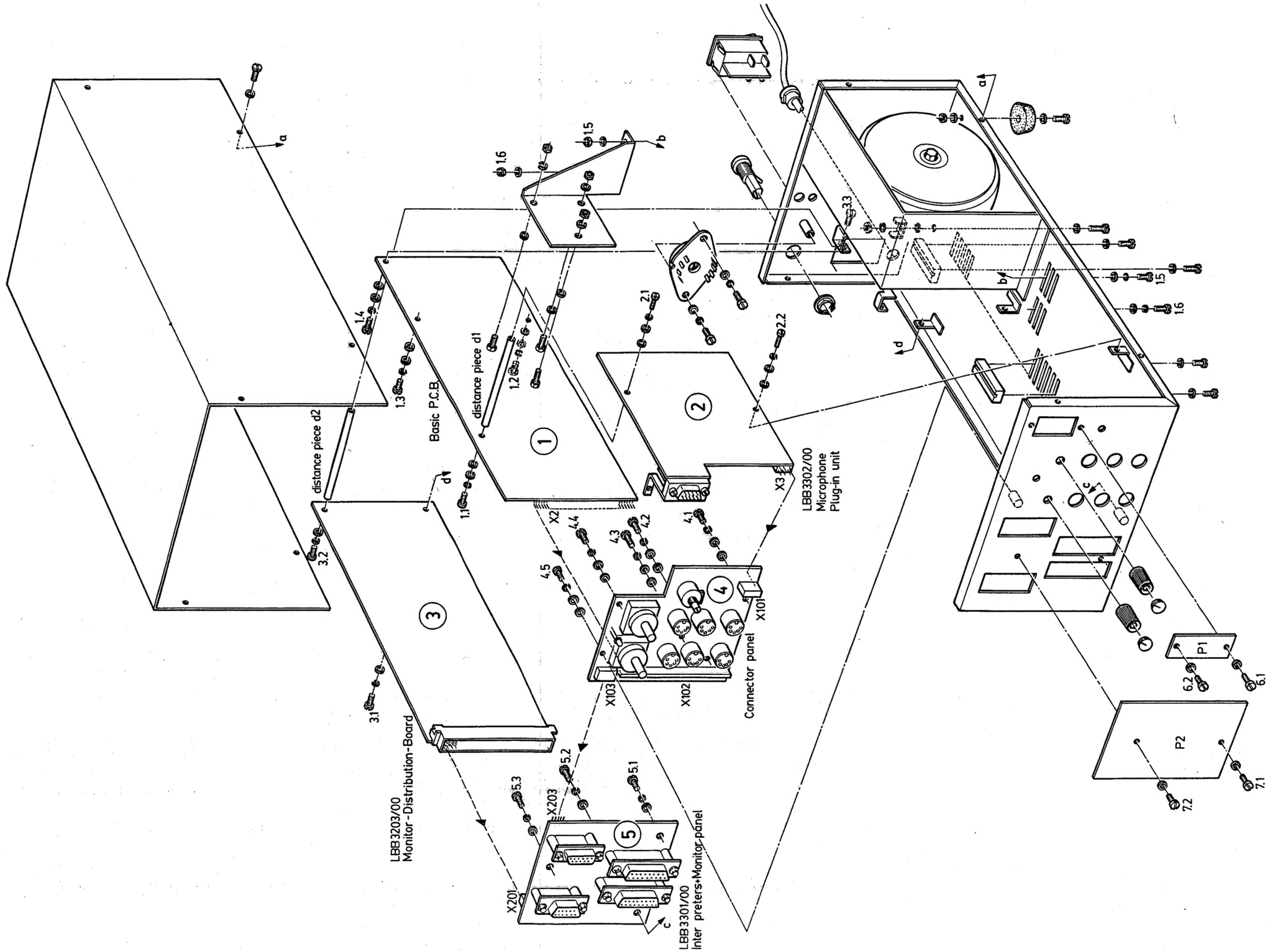
SYSTEM BLOC DIAGRAM C.S.U.



DETAILED BLOCK DIAGRAM C.S.U. AND PERIPHERALS WITH FIRST LINE DATA



EXPLODED VIEW C.S.U.



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Service Information

Advanced Automation Systems
Audio-communications
Broadcast Equipment
Electronic Security & Recording Systems
Industrial Automation
Scientific & Analytical Equipment
Test and Measurement

Industrial & Electro-acoustic Systems Division

cat. DOCUMENTATION CHANGES	nr. DC195	DC195CS044	date 09-02-1988
art. gr. CONGRESS SYSTEMS	nr. CS044		rev. sheet 1 of 1

Product : CENTRAL SUPPLY UNIT LBB 3300/..

Service manual : 4822 733 24251

Already published :

Reason : COMPATIBILITY WITH CENTRAL CONTROL DESK LBB 3386

Contents : When the central supply unit with a serial number up to 1000 is used in combination with the central control desk, a connection has to be made between point 5 of DIN connector BU104 (DEL 2) and point 30 of connector X102.

Ger van Dongen
Service Prof Audio.

PHILIPS

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